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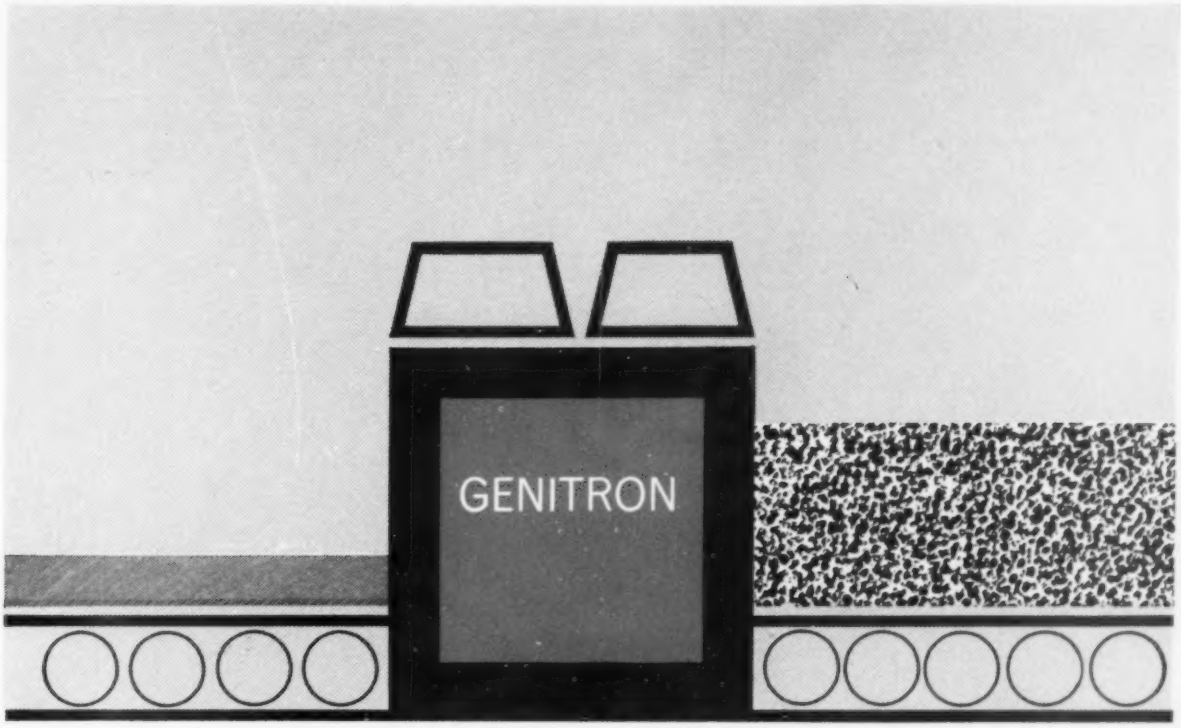

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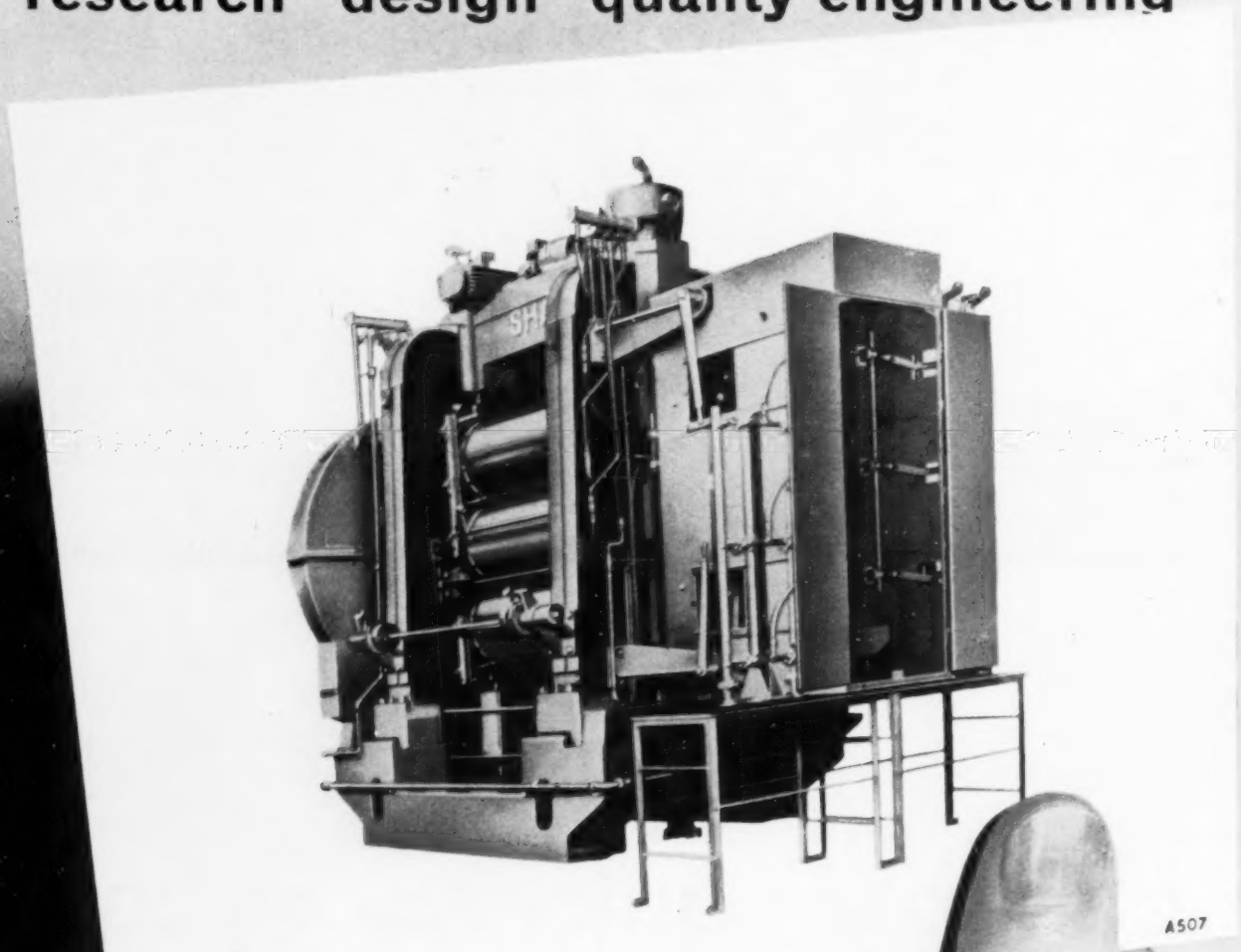

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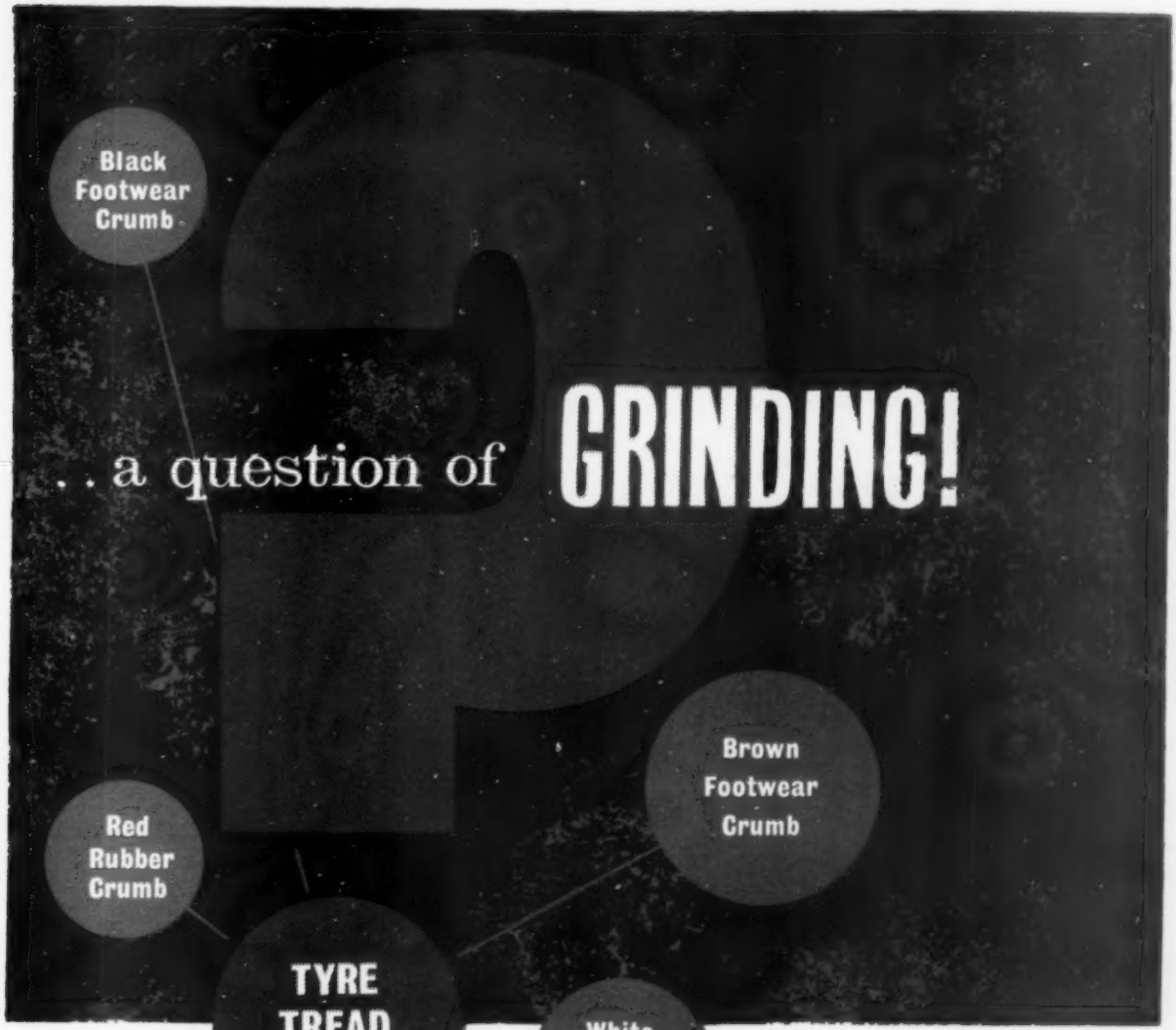

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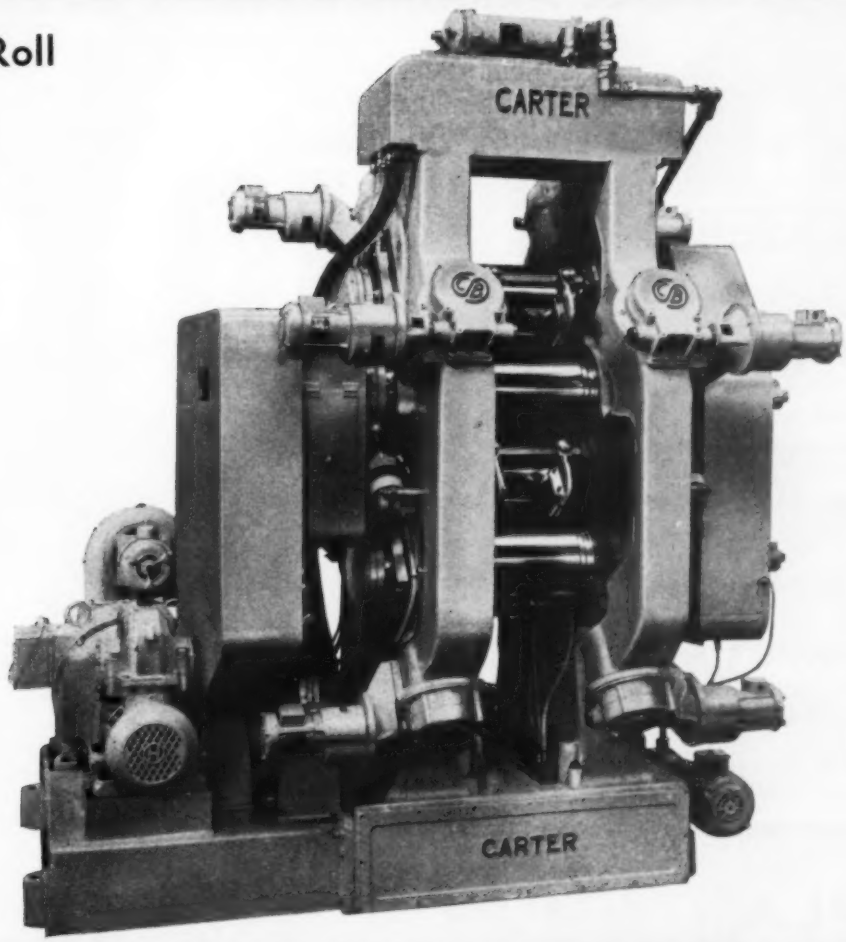

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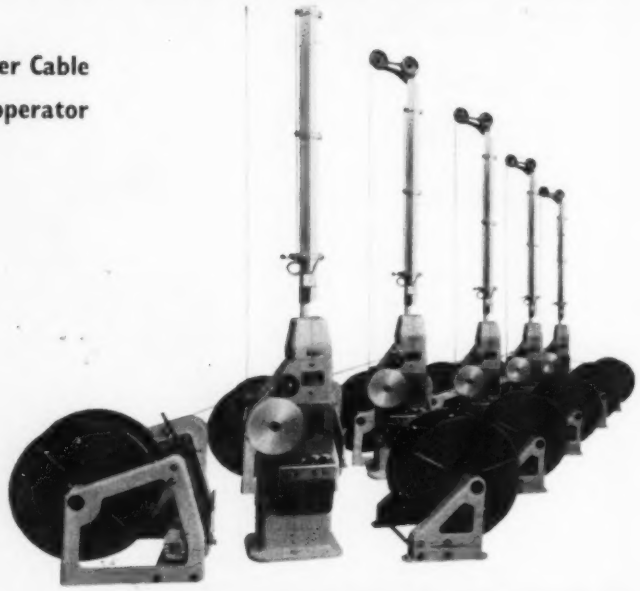

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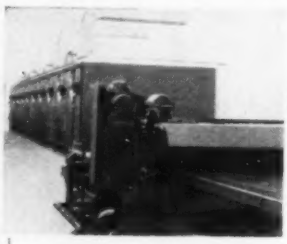

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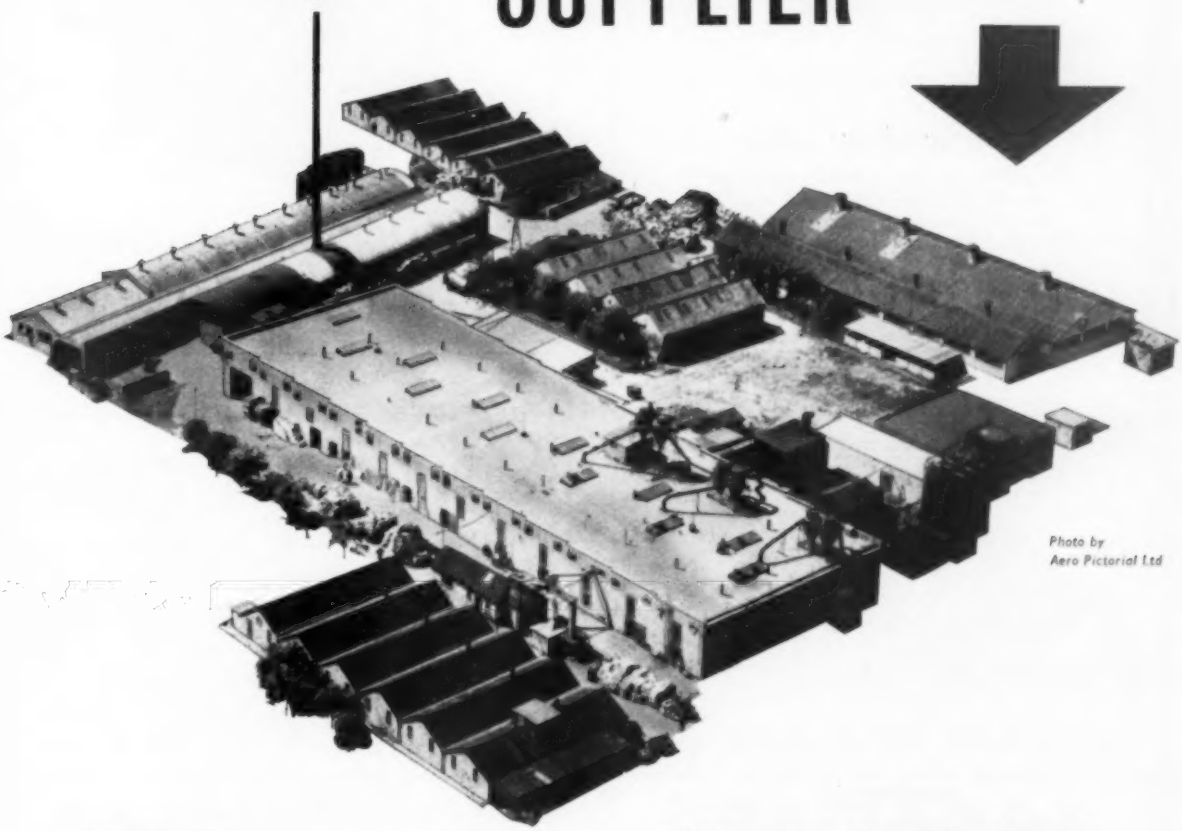

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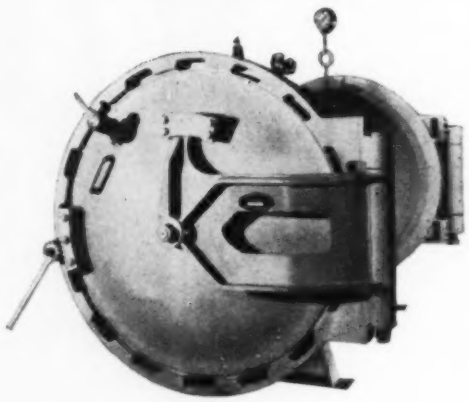

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RUBBER and PLASTICS WEEKLY

Formerly 'Rubber Journal and International Plastics'

Volume 140 *IN ITS 77th YEAR* **No. 21**

May 27 1961

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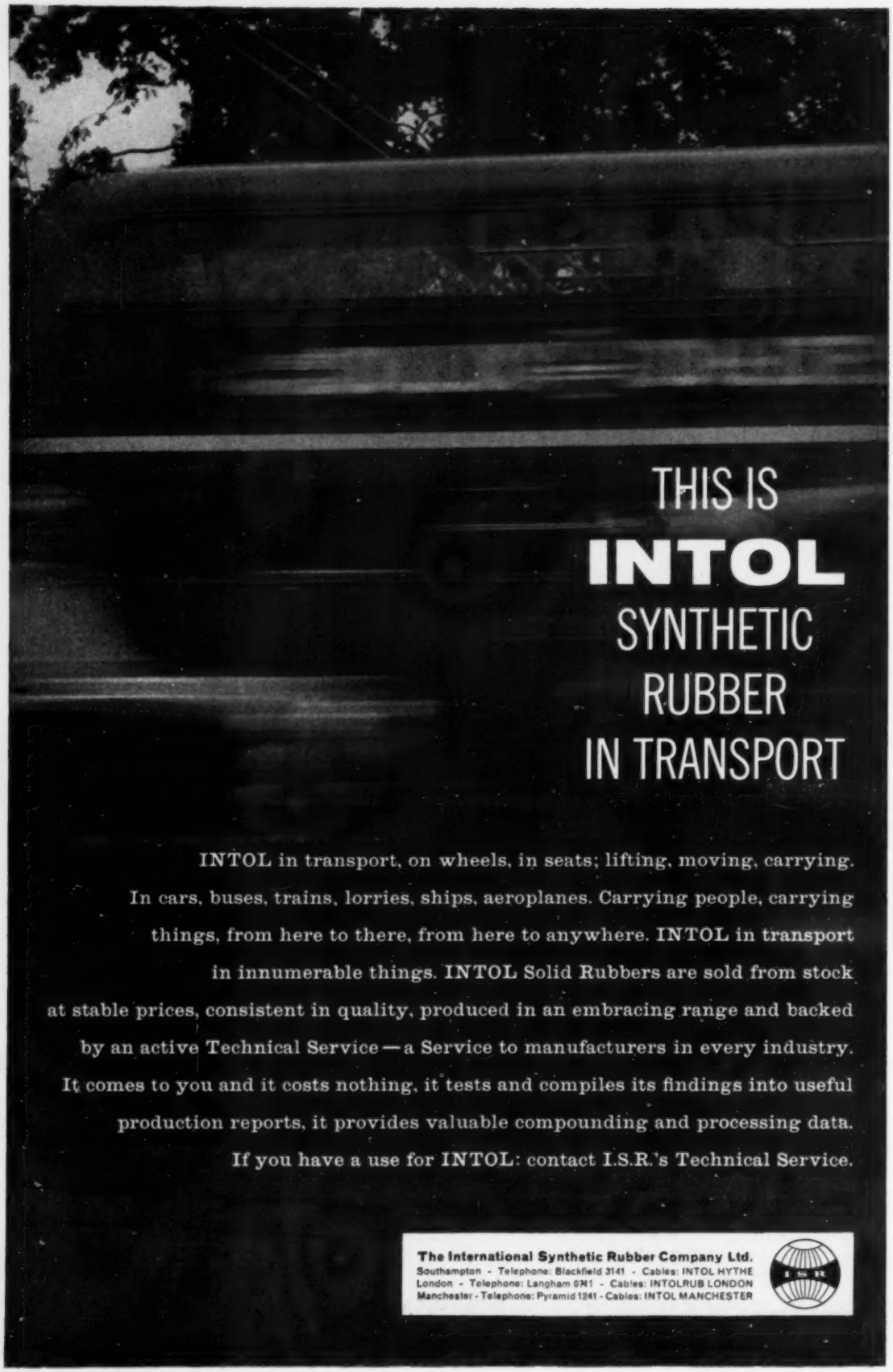
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NOTES of the WEEK

Emergence of the Bulge

COMMONWEALTH Technical Training Week—which starts on Monday May 29 — comes at a time when the first of the very large age-groups resulting from the post-war rise in the birth-rate is about to bulge into industry. Whereas in 1959 there were 570,000 school leavers, this year it is estimated that there will be close on 700,000. Expanding industries like the polymer industry can certainly absorb the extra talent that will be available; but it must be trained talent. The problem, in fact, will be one of training rather than absorption, and in order to tackle it technical institutions will need the close co-operation of industry.

Next week will provide an opportunity to assess the progress made in technical training. A great deal has been done in the last five years. The number taking sandwich courses has risen from 1,400 to over 10,000. The number taking part-time day courses stands at well over half-a-million, and the enrolments in these courses last September showed an increase of 35,000 over the previous year. Altogether there are now over two million students in further education. These figures represent good progress, but there are disturbing features — one of which is the public attitude towards technologists and technical training.

Not so Equal

'I DO not believe the public are aware of the progress already made (in the field of technology and science outside the universities)', Sir David Eccles, Minister of Education, said recently. 'If you look at the top flight only, there are 15,000 places in the technological departments of the universities and already between 8,000 and 9,000 students in colleges of advanced technology studying for Diplomas of Technology'.

The 'Dip Tech' is equivalent in standing to an honours degree, theoretically and practically—but not socially. Since the first awards have been made, successful students have found that the really good job tends to go to the man with a degree, equivalence or no equivalence. One reason for this has been succintly stated in an article in *The Times*. It is 'the low esteem in which technological education is held in Britain. It lacks the status of the arts; it has none of the glamour of pure science; it is a necessity but a bore. As a topic for debate it will empty the House of Commons quicker than most'. This comparative attitude is having an unfortunate effect on the colleges of advanced technology themselves. With lower salary scales — and a lower social standing — than universities, they are finding it difficult to recruit lecturers for senior posts.

This should be a point of concern for every industrialist. For years there has been the tendency to think that we produce scientists who think up brilliant ideas, without producing the men who can put the ideas to brilliant commercial use. Now we have a system for training men who will do exactly this it seems pointless — particularly if we are in industry — to jeopardise it by persisting in the feeling that they are of slightly inferior caste. The attitude will adjust itself in time, but meanwhile a number of things could be done. If the 'Dip Tech' is equivalent to a degree, there is no reason why it should not be called one. And there is a case for removing the colleges of advanced technology from local authority control and setting up a new administrative structure in which industry, through independent institutions, can play a greater part.

Polymers at Home

MORE than anywhere else, polymers meet the critical public eye in the home. This week's special feature on rubber and plastics in furnishing indicates the extent to which polymers have taken over from traditional materials in this field. Rubber has, of course, been well established for a considerable time, and the most interesting developments now are on the foam side. Last month Dunlop's Hirwaun polyether plant, which can produce 140lb. a minute, went on stream. BTR Ltd.'s Silvertown plant, with a potential capacity of 16,000 tons a year, is due to start producing soon. It is impossible to estimate what proportion of the 'cheaper end' of the latex market polyether foam will take, but it is safe to say that by far the biggest proportion of sales will be made at the expense of conventional materials.

Plastics have conquered the kitchen and the bathroom, and are now turning to the rest of the house. Here they have met with the usual resistance. But if the design is suited to the medium, and the correct material is chosen — and if the price is right — they will be accepted. As always, but particularly in this sphere, plastics must find their own level of design, and set their own fashions.

NEWS *Briefs*

CYCLOHEXANE PROJECT — GSA RUBBER LOWER FLOOR PRICE RUMOUR — JAPAN DIENE SCHEME DUNLOP IN NIGERIA — FIRESTONE PLASTICS

●**Nigeria** — Dunlop announce that they intend to set up a £2m. factory for the manufacture of lorry and bicycle tyres and tubes in Nigeria. A new company will be formed for the purpose and in response to widespread assurances of support. Nigerian interests will be invited to subscribe 49% of the equity. A new option has been secured on a site on the industrial site at Ikeja, near Lagos, and a team of experts will shortly visit Nigeria to make the preliminary arrangements for the construction of the factory, which is planned to be in operation by the end of 1962.

●**Kerala** — The Kerala Minister of Food, E. P. Poulose, has announced that some 10,000 acres of Government forest land will be turned over to rubber cultivation during the current season. Half this acreage will be planted by private cultivators and the remainder by the Government. Mr Poulose told a Rubber Board Staff Association meeting, and added that details of land allotments would be made public very shortly.

●**Japan** — Phillips Petroleum Co., Bartlesville and Bridgestone Tire Co. Ltd., Tokyo, Japan, have announced the signing of a polybutadiene synthetic rubber licensing agreement under which Bridgestone will build a 10,000 ton per year plant in Japan, using the Phillips process and technical knowledge.

●**United States** — Expansion of production facilities at Firestone Plastics Co.'s Exon vinyl resins plant at Pottstown, Pennsylvania, has been completed and production in the enlarged facilities is now under way. The programme included the enlarging of the reactor building, installation of 12 additional reactors, construction of a new sub-station, pump house and cooling tower. These new facilities will enable Firestone to increase its production capacity for resins and paint latices by approximately 20%.

●**India** — East Anglia Plastics Ltd. will shortly be producing plastics chemicals. The company also proposes to produce cellulose acetate moulding powder and polyvinyl chloride compounds, and a factory is being built near Calcutta which is expected to go into production in September. Land has also been acquired to set up a second factory in Durgapur to produce cellulose acetate flakes and acetate yarn.

●**West Germany** — A vertical continuous vulcanization line for covering heavy cable with rubber sheathing, is to be supplied by Fawcett Preston, a company in the Metal Industries Group, to Rheinische Draht und Kabelwerke of Cologne. This will be the first line of its type to be erected in Western Germany.

●**Canada** — Cyclohexane, a petrochemical previously imported from USA for use in the manufacture of nylon, will soon be produced in Canada. British American Oil plans to install new facilities at its Clarkson, Ontario, refinery to produce the petrochemical for sale to Du Pont of Canada for processing into nylon at its Maitland, Ontario, plant. Construction of the cyclohexane plant is expected to commence early in 1962.

●**United States** — Commenting on Singapore rumours that the US authorities were considering a lower floor price for the disposal of Government stockpile rubber, local rubber dealers said such a possibility had been a threat on the market for a long time. Some quarters were of the opinion that in time the US Government would lower the floor price in order to be a free seller at all times. However, with the outside price for rubber currently well above the Government's minimum of 30 cents, the feeling was that no immediate action would be taken. A General Services Administration spokesman said that, although the subject was being discussed by interested Government agencies, there were no immediate plans for lowering the floor price.

●**Israel** — Melons grown under polythene film covers (produced on the spot by an agricultural settlement's plastics factory) were reported to be ripe and ready for export three months earlier than usual.

●**Spain** — The Spanish Government announced this week the refund of certain internal taxes to exporters of vulcanized and hardened rubber and their manufacturers. The announcement said the refunds, averaging 10 to 15% on export prices, became effective on May 15.

'I get the impression, Bugby, that you're not entirely happy with the way I run the Mill Room' — 538

Takeover Bid for Kleemann

SOCONY MOBIL PLANS TO ENTER UK PLASTICS INDUSTRY

AN offer for the whole of its ordinary and preference capital has been received for the O. and M. Kleemann group. Worth nearly £7m., the offer comes from Mobil Holdings, a wholly owned subsidiary of Socony Mobil Oil Co., one of the world's largest oil companies.

It is reported that the Kleemann directors intend to recommend acceptance of the offer. A statement from Mobil indicates that, if the proposal goes through, there will be no change in the management of Kleemann.

Major Extrusion Centre

The products of the Kleemann group — O. and M. Kleemann Ltd., Erinoid Ltd. and Kleestron Ltd. — cover plastics raw materials and intermediate products, including polystyrene sheet and profile extrusions in a wide range of materials. The group's extrusion plant at Stroud, Kent, covers 50,000 sq. ft. and is one of the major centres of profile extrusion in Europe. Raw materials marketed by the group are: polystyrene, cellulose acetate, casein sheets and blanks and high density polythene. In addition low density polythene manufactured by US Industrial Chemicals Co. is sold by Erinoid.

Socony Mobil announced plans last year for an expansion of its interests in the chemical field, forming a new company called the Mobil Chemical Co., which is constructing an ethylene plant at the Beaumont, Texas, refinery.

Mobil has refineries in the UK (at Coryton, Essex, one of the few UK refineries with no petrochemical complex associated with it) in Germany, France, Austria and Italy. At the Italian refinery, near Naples, an aromatics plant is being constructed.

The take-over bid is a reflection of the tendency for plastics raw materials manufacturers to acquire or set up interests in fabricating companies. Distillers' take-over of British Xylonite is the most recent example. Last year Shell International announced that it was forming a company to produce polyolefin packaging films for marketing outside the USA and Canada. I.C.I. owns British Visqueen, a major producer of polyolefin film in the UK.

Rights Issue by Distillers

Ordinary shareholders of the Distillers Co. Ltd. are to be offered one 10s. Ordinary share for every ten held on June 1. The price will be announced later.

It is believed that the new money is required to finance increases in stocks and capital developments.

Among the company's commitments are the recently announced Baglan Bay £10m. petrochemical complex which is to be constructed by British Hydrocarbon Chemicals Ltd., half-owned by Distillers.

BICC Strike

About 100 employees of British Insulated Callenders' Cables, working on railway electrification near Colchester, are on unofficial strike over welfare conditions and safety precautions.

Owens-Corning Break New Ground

OWENS - CORNING Fiberglas Corporation has introduced in the US domestic market new acrylic panels designed for roof and sidewall lighting, and other industrial and commercial applications. This marks the initial entry of the company into production of finished products. According to a company spokesman the move into panel manufacturing operations was prompted by the rapidly expanding market for these products and need for improved industry standards.

First With Acrylic

The new Fiberglas Daylighting Panels are the first to use 100% acrylic resin as the bonding agent. The Lucite resin, developed in co-operation with Du Pont after eight years of research, gives the panel outstanding resistance to weathering of all kinds, and provides superior light diffusion.

The construction of the new panel is described as a triple-reinforced laminate. The acrylic bonding resin is combined with one heavy centre ply of glass reinforcing mat, and a ply of surfacing mat on each face of the panel, where maximum weather resistance is of prime importance. Exposure of the panels for three years at the South Florida Test Service at Miami, site of the most intense sunlight and ultra violet concentration of any area in the US, caused no visible change in the product. And a 2,000-hour weatherometer exposure showed no change in surface gloss, and no fading. Panels using conventional bonding resins, which were subjected to the same test, showed a 35% loss of original gloss for those with surfacing mat, and 75% loss for those without surfacing mat.

Recommended applications for the new panel include skylights, siding, partitioning, replacement of existing sash and glazing, and housing and equipment covers. The panel is shatterproof and will not rot, rust, corrode, or peel. It also resists damage by industrial fumes and most acids, and needs very little maintenance.

Cycolac Colour Code

New packaging for Cyolac ABS polymers, featuring a colour coding for instant identification of resin types, has been introduced by the Marbon Chemical Division of Borg-Warner Corp., whose UK agents are Anchor Chemical Co. Ltd.

The design for the new 50lb. bags incorporates a top area for the code. Type L is coded in green, LL in red, H in yellow, T in orange, GS in magenta and C in brown. Special and experimental compounds will be coded with a black X.

Furnishing the Ship

A Canadian ship, the *Booker Venture* — 10,700 tons — has been built in the amazingly short time of 21 weeks. Specially designed to enter Georgetown Harbour, and to navigate the St. Lawrence Seaway, it has been constructed principally to carry bulk sugar.

Warerite laminated plastics have been used extensively for a large variety of locations, ranging from the hospital to the petty officers' mess.

Submarine Pipeline

A new 10,000 ton bulk-cargo carrier the *Photinia* has been chartered by British Insulated Callender's Cables Ltd. to lay the 53-mile submarine pipeline between Vancouver Island and British Columbia.

This pipeline, which is lined with pvc, is due to be laid in the summer of 1963 and will transmit a supply of natural gas (*RPW*, January 7, 14).

Extensive conversions will be carried out on the ship including a Voith-Schneider bow propeller to give greater manoeuvrability, and the necessary bow gear for paying out the cable.

NCB Order for BTR

FOR NEW TYPE OF FIRE RESISTANT BELTING

BTR Industries Ltd. announced this week that over 4,500ft. of its Tuftex fire resistant conveyor belting has been supplied to the National Coal Board for Pit House Drift — one of the NCB's largest and most important installations. Tuftex is the company's latest development in belting and is a patented construction consisting of a continuous filament stress member with a cotton cover warp and a continuous filament nylon weft (see the figure) and is said to represent 'a major departure from conventional methods of weaving fabric'.

Without Shock or Surge

The drive unit at Pit House Drift is a Meco 300hp unit with an electrically controlled scoop-type hydraulic coupling. The length of the conveyor is 2,199ft. 4in. between centres; the gradient of the drive varies from being almost flat at load point to 1 in 4.36, and the total lift is 478ft. Without shock or surge the belt can be accelerated to 421ft. per min. in 10sec. and can be stopped smoothly under capacity load in 5sec.

The belting supplied is of three-ply construction only but has a breaking stress of over 6,000lb./in., is designed to operate at a maximum tension of over 600lb./in., and was manufactured by BTR in four lengths each of approximately 1,200ft. and each weighing five tons. The joints were vulcanized on site by BTR technicians.

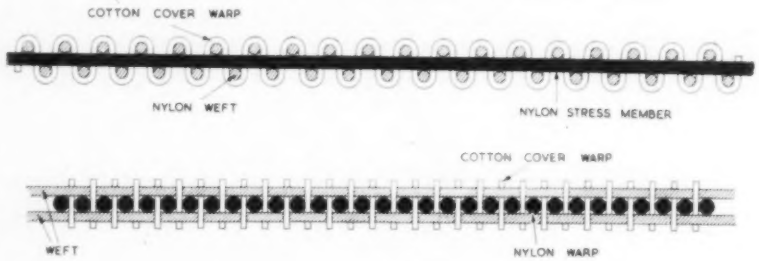
The belt has been on trial for nine months, handling approximately 1,200 tons weekly without any difficulties being reported.

Tuftex is made in two to eight-plies dependent on the width of the belt. For belts of three-ply and over the company says that the joints should be spliced and can be operated at 200lb./in./ply. The maximum working stress for the two-ply belt, either with fasteners or spliced, is 240lb./in. A three-ply belt with fasteners can be operated at 440lb./in.

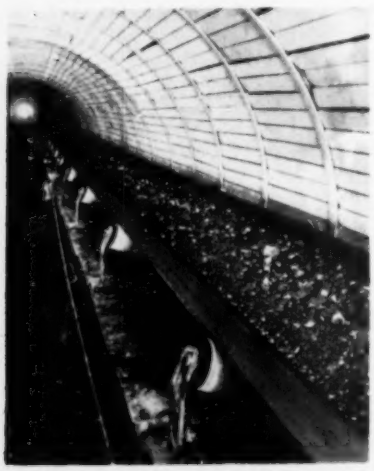
Apart from its high tensile characteristics the belting claims higher impact resistance and tear resistance than conventional belts, a high degree of flexibility, greater resistance to shock loads, and improved adhesion.

It can be folded over itself without being subject to lateral cracks or longitudinal splits; if the carcase is damaged locally the rip will not spread; pulley diameters can be smaller then normal for belts which are so highly stressed.

The company expects that the belting will find a considerable outlet in installations where high tonnages and large, sharp-edged materials are handled over long distances.



Top: **section across the weft of the belting.** *Bottom:* **section across the warp**



A section of the new belting at Pit House Drift, Durham

Invasion of Heavy Duty Tyre Field

THE chairman of the Rubber Growers' Association, W. Anderson, speaking at the annual general meeting, said that the year 1960 was significant in that, for the first time under peacetime conditions, more synthetic rubber was consumed than natural rubber. This was because the price of natural compared with synthetic made it less attractive to the rubber manufacturing industry.

The heavy duty tyre field was one of the last preserves of natural rubber and its invasion by synthetic rubber was regrettable, the chairman went on. Not only were the manufacturers successful in producing a satisfactory small-sized heavy duty tyre from synthetic, but to do so they had had to install new equipment. This meant that, even if in the future the price of natural rubber became more competitive with that of synthetic there might be less incentive to the manufacturers to reconvert to natural.

Synthetic Encroachment

This encroachment by synthetic rubber was the more disturbing, Mr Anderson added, when it was realized that it was made by SBR. The past year had, however, seen the commencement of the commercial production of the new stereo-regular synthetic rubbers. At the moment it might be true that neither of these new materials had been perfected, but it would be a mistake to assume that this would always be so.

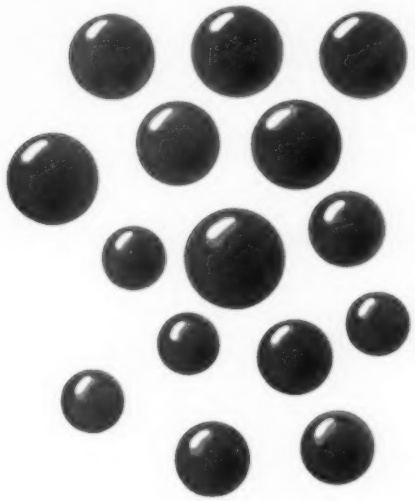
'We must replace our old low-yielding areas with modern high-yielding material,' Mr Anderson said. 'Many of us have already done so to a very considerable extent and are in a position to sell our rubber profitably not only at today's price for synthetic but even at substantially lower prices. It may be that we will have to meet prices for synthetic lower than today's levels, for if competition intensifies it can be expected that producers of synthetic rubber will endeavour to reduce their prices.

'If organized labour plays its part along with governments and ourselves then despite the technical improvements which have taken place in synthetic rubber we need have no fears for the future', he added.

See Company Meeting: page 814

Emerson Walker

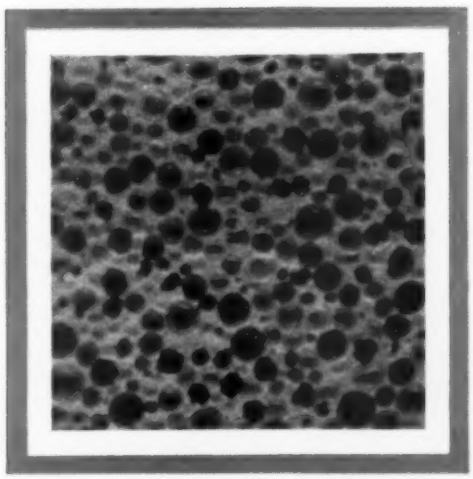
Emerson Walker, the Gateshead marine engineers, has entered the plastics machinery field. Under a recent agreement with Martin Rudolph of Velbert, West Germany, the company is to make and sell in the UK and the Commonwealth, the complete range of Rudolph machines.



BLOWING AGENT

Ancablo A is a powerful inorganic blowing agent for use in natural and synthetic rubbers. It produces a very regular cell structure and up to 600% inflation can be obtained in press cures 1½" thick. It is a white free-flowing powder stable in storage.

Inflation 300%
Magnification x 10



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RAPRA Plastics Technical Meeting

THE NEED FOR STANDARDIZATION OF TEST METHODS STRESSED

A RECENT plastics technical meeting of the Rubber and Plastics Research Association clearly showed that the new plastics members of the Association are now actively studying the programme of work to be forthcoming. The Royal Institution was a happy choice of venue, with its long traditions of research of immense value to industry from the Davy safety lamp and Faraday's embryo electric motor onwards. The lecture hall there is ideal for experiments to illustrate talks, a fact well appreciated by the RAPRA staff in their part in the proceedings, and for general discussion. Companies represented numbered 108.

Enter Plastics

The chairman of the RAPRA Plastics Research Committee, H. A. Collinson, described the purpose of the meeting as first learning something of the current work of the Research Association during the morning in order to have an informed discussion in the afternoon on the extension of its work more fully into the plastics field.

The Director of Research of RAPRA, Dr W. F. Watson, talked briefly on the nature of the Research Association's work, making the point that 'Research' in the name gave a too restricted implication of the technological help, advice, and development work proceeding and information services at the disposal of members.

Long-term research, requiring about an equal proportion of the budget to technology and information services, was also recognized as a most essential activity in maintaining the reputation of the laboratories and in adding its share to the progress of the industry.

Productivity Analysis

Dr W. C. Wake, head of the Research Division, then described the work his group had done in the field of productivity analysis in co-operation with individual member companies of the Research Association. He concentrated on extrusion productivity and showed clearly the value of this work to the participants.

R. H. Norman, senior physicist, described how a research programme on friction of pvc cast up some interesting results on wear debris very pertinent to the friction of pvc in applications including conveyor belting. A. L. Soden, Deputy Head of the Technology Division, then gave an entertaining and informative talk and demonstration of fluid bed processing techniques for continuous vulcanization of extrusions.

Committee Proposals

The chairman at the beginning of the afternoon session put forward the proposals of his small committee, composed of Maldwyn Jones, Dr J. J. P. Staudinger, C. Wainwright and himself. The committee suggested four lines of work to be tackled:

(1) Rheology.
(2) Standards for methods of test.
(3) Productivity studies, particularly on moulding and fabricating which might be an exception to the decision that no work could be done until buildings were provided. Survey work in factories would not require laboratory facilities and could possibly start before the end of this year.
(4) Liaison with other Research Associations and Stations, *e.g.* on toxicity with the newly-formed Research Association dealing with this subject.

He then called on two members of the committee, Dr Staudinger and Mr Wainwright, to amplify the suggestions which they had made to the committee.

Flow Properties

Dr Staudinger referred to most operations in the plastics industry as involving forcing methods for transformation of masses of material. He said that in carrying out research by using very dilute solutions, we observed how molecules behaved when separated from their fellows. We knew very little about their behaviour as molecules closely associated together in the mass. It was the mass phenomena that required investigation for these phenomena were those utilized in processing. For example, we did not know if molecules flowed as a whole or whether they flowed in segments. Even such a system was relatively simple compared with industrial practice because here the polymer was often associated with pigments or other polymers. His first priority for research would therefore be the study of flow properties in relation to structure and in relation to mixing of the mass material.

Test Standardization

Mr Wainwright, introducing the subject of standardization of methods of test, said that such work could profitably be carried out by RAPRA, could be used immediately, and would take a burden off the shoulders of the individual company. He listed as the sort of things he had in mind: (1) The evaluation of test methods proposed by TC 61 (the technical committee of the International Organization for Standardization). (2) The evaluation of test methods arising from the preparation of British Standards. (3) The examination of new test apparatus as it became available. (4) Development of new analytical methods particularly those concerned with traces of toxic metals. (5) Evaluation of the Xenon lamp as an instrument for assessing ageing and weathering. In this connexion he stressed the importance of considering the influence of humidity. (6) He would like to see the Taber abrader examined, particularly as a means for evaluating wear resistance of faced laminates. (7) He felt that the Association could be a repository for test instruments not in general use but required for specific tests at ASTM or continental specifications. It was obviously wasteful for each company to own these often expensive instruments and he felt the RA should have the instrument available and be ready to carry out tests for members. (8) Long-term stressing of plastics.

He realized that the list was long but he had drawn it up to show how very much work there was which the Association could profitably undertake for its members.

Small Scale Testing

The chairman then introduced Dr Megson of the Ministry of Aviation, well known for his work over many years on plastics. Dr Megson said that the kind of work the Association should do should comprise the problems affecting the whole industry. He agreed that rheology was an ideal subject and that standardization was of equal importance. From the official viewpoint of the Ministry of Aviation, with its interest in high-speed aircraft, and therefore heat

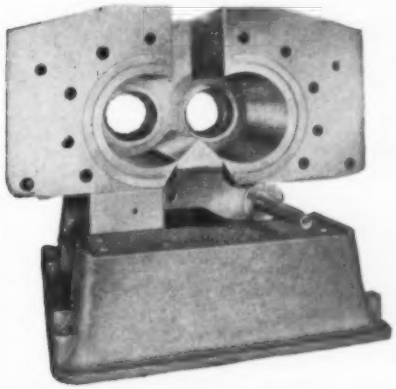
NEW BANBURY* DROP DOOR DELIVERS 3 BIG BENEFITS

- **leakage prevention**
- **shorter cycles**
- **almost instantaneous discharge**

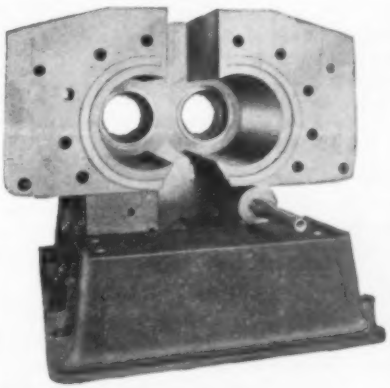
Here's a new development in Banbury mixer design: the hydraulically operated drop-door . . . now available as an optional feature on all new production-size machines. The drop-door design does away with a source of leakage and contamination which cannot be avoided in sliding-door design. Clearances which permit some leakage are required for sliding action which is not the case with the drop-door. The new door is hinged, and the surfaces of the door edge and the bottom of the mixing chamber are tapered so that a good line of contact is obtained. The door is leakproof throughout a full period of normal wear and there are no tailings left to contaminate a succeeding batch. The new door has been clocked as low as eight seconds for opening, discharge and closing—more than twice as fast as a sliding door. As a result, the overall mixing cycle is reduced. And, in short-cycle operation, discharge time is in better balance with actual mixing time.

Faster discharge, besides cutting cycle time, is particularly advantageous when formulas require almost instantaneous discharge after pre-determined temperature is reached. With some, a few seconds lag will permit the stock to set up in the mixing chamber.

* *Banbury is a registered trade mark in many countries throughout the world*

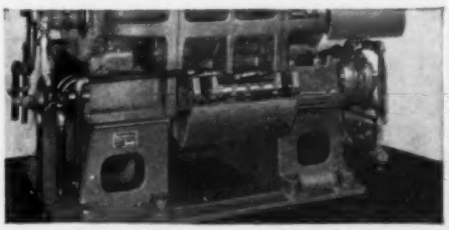


Chamber of Banbury with drop door in closed position



Drop door partially open

Angular view of drop door in open position



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resistant materials, he would like to see methods of evaluation devised to deal with gramme quantities and covering a wide range of physical properties. This would involve testing as well as preparation facilities on the small scale.

A number of speakers supported these proposals and added others in the vigorous discussion which followed until the meeting was terminated.

Independent Laboratory

The question of testing and standardization was repeatedly mentioned. There is obviously a wish for an independent laboratory to participate in the setting up of standard test methods, BS and ISO work. Creep under stress, weathering and other ageing tests were particularly emphasized. It was also suggested that RAPRA should extend their certification scheme to provide for plastics end-products, as is done on the Continent. Extension of the sponsored consultancy service was also advocated.

It was mentioned that membership of the research association would provide members with a means of coordinating their effort and dovetailing into it the work of the RAPRA staff. For example, experience on test methods could be pooled. Again, individual companies might well participate with RAPRA staff in development work.

Dunlop at Sea

Dunlop liferaft equipment at the recent Marine Exhibition included an eight-man Seafarer inflatable liferaft, and a rigid glass fibre container for the stowed raft. The range of Seafarers manufactured by Dunlop extends from six to 25-man versions.

Recent additions to the number of vessels equipped with these rafts include several Russian tankers now building, and the British Railways passenger ship *Cambria*.

On the stand of Welin-Maclachlan Davits Ltd., was a model of a davit-launched liferaft in use with the Welin-Maclachlan davit and the William Mills (Sunderland) automatic release hook. This method of launching (approved by the 1960 Convention for Safety of Life at Sea) enables inflatable liferafts to be launched from ships of high freeboard after being loaded at deck level. In an emergency a davit-launched raft can be thrown overboard and inflation started by a sharp pull on the painter.

A glass fibre liferaft container complete with hydrostatic release was also shown. This device automatically releases the liferaft from a vessel that has become submerged before normal release can be effected.

High-speed Cable Production

NEW 24in. DOUBLE TWIST BUNCHING MACHINE

AMONG the recent developments in cable making machinery produced by John Docker and Co. (Engineers) Ltd., Feltham, Middlesex, is a high-speed bunching machine.

This is capable of bunching up to 162.0076in. cables with a variable lay range between 0.5in. and 8in. This includes a new three-speed drive to enable a higher quality cable to be produced, irrespective of numbers and diameters of wire, and cable and speed control can be synchronized with the manufacturing requirements.

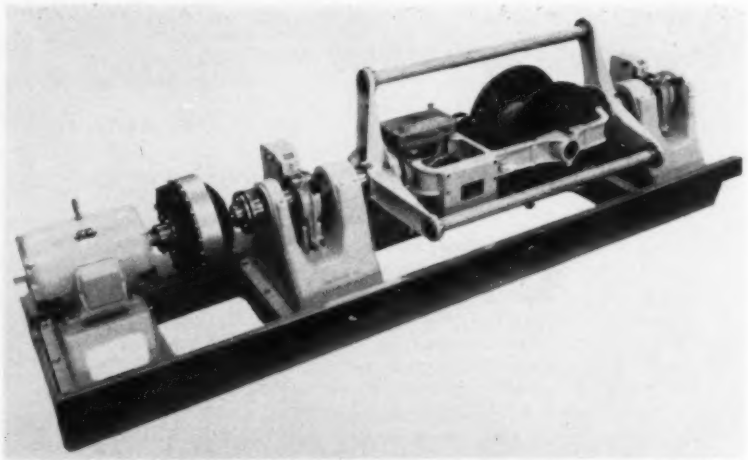
The maximum output with this drive, in inches per minute, is 2,000 x the lay required.

The whole machine has been designed with the aspect of safety, ease of operation and maintenance service in mind, and includes such features as bearing housed stub spindles that cannot disconnect from their locked position or foul the high speed rotor. An underslung bobbin support is fitted to the cradle for ease of loading and freeing the operator from the arduous tasks of controlling a bobbin to line up with loose spindles.

The hauling, lay change and bobbin drive is housed in one aluminium gear case, which includes a lever control reverse gear for opposite lay operations. This whole unit is readily accessible for service or maintenance and simply removed from the machine.

A measuring unit, fitted to the cradle, gives cable measurement after the wire is bunched. The machine is driven by an electric motor connected direct to a hydraulic traction coupling. Electro-magnetic brakes are fitted to the rotor trunnions.

When open, the sheet-metal guard gives complete access to the machine for loading and unloading. Both motor and brakes are in circuit with safety switches fitted to the sliding doors on the guard.



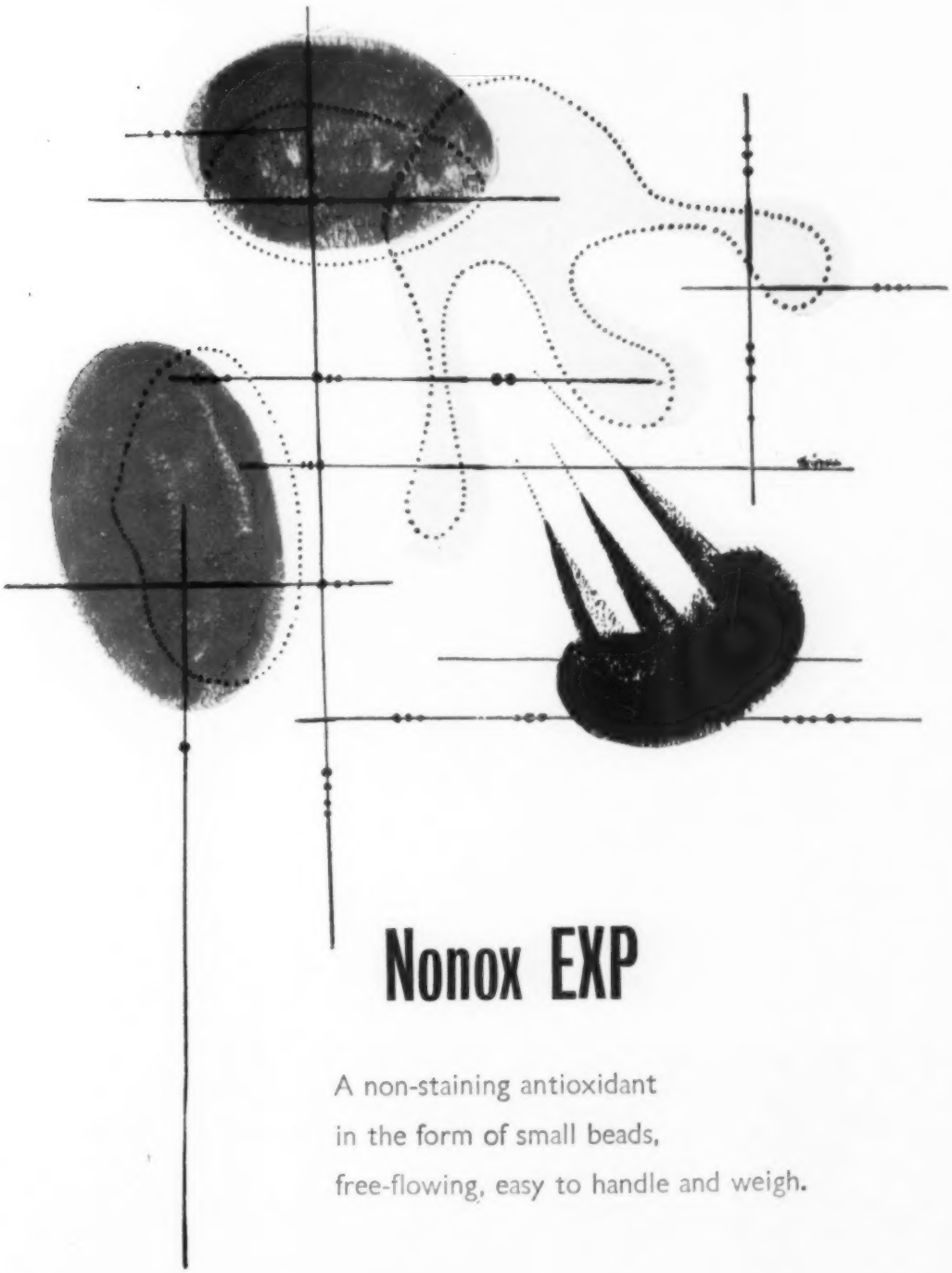
The double-twist bunching machine produced by John Docker and Co. (Engineers) Ltd. incorporates a three-speed drive enabling a high-quality cable to be produced at speeds as high as 1,300ft. min.

On Trial in Dock

Synthetic resin glues have justified their choice for a most exacting test at London's East and West India Docks where a laminated boom 12ft. long has been lifted from the water after nearly two years' immersion. These booms have previously consisted of three or four lengths of 12in. sq. timber bolted together, and are used in the river at the entrances to the docks where they serve as buffers between the river wall and vessels waiting to enter the lock.

Owing to the continual rise and fall of the tide, the buffeting from ships and from the wakes of passing ships, the wear of the timber against the wall is considerable. Eventually the countersunk bolts become exposed and damage the adjacent wall.

The life of a boom has now been prolonged and the wear on the wall decreased by gluing the timbers together with 'Aerodux' resorcinol glue made by Ciba (ARL) Ltd. One 12in. lamination of a boom glued nearly two years ago has worn away almost completely but the glued joint is still intact.



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MEN *and* MATTERS

A Review of People and Events

by Peter Richards

SUCCESSFUL selling to America is always news. Foster Yates and Thom, the Blackburn machinery manufacturer, has an excellent record in this respect. Recently it completed its hundredth low pressure screw type injection moulding machine —'the Foster-Wucher W.700' —and this is scheduled for delivery to an American firm.

The machine, which will in this case be used for moulding pvc unit soles, is automatic in action. It will be leaving this country at the beginning of next month for Sheraton Plastics of Brockton, Massachusetts. This is the fourth unit soling machine Sheraton has taken.

The first 'W.700' was built in 1956 and was hand operated. Since then the company has carried out extensive improvements to the machine which now has a first-class reputation in the boot and shoe industry. Of the 100 machines which have been exported to 27 different countries outside the UK, 15 have gone to America.

In the Spin

North British Rubber Co. Ltd. added a beat to the bounce of rubber the other week, when it held the 'Keds Rock 'n Roll Championship of Great Britain' at the Lyceum Ballroom. Twenty-seven couples exhausted themselves before judges who included Edmundo Ros and rock star Billy Fury, in an attempt to win the first prize of £100 and a challenge cup, which eventually went to a couple from Cheshire.

This clever promotional scheme for Keds — direct moulded casual shoes — killed two birds with one stone. While the teenagers were being urged to 'get in the spin with Keds', they were watched by 700 well-entertained guests representative of the footwear trade.

A Weekend With Geigy

On Thursday June 8, 30 employees of the Geigy Co. Ltd., all of whom had been with the firm for 25 years or over, will leave London by air for a long weekend in Switzerland, where they will be the guests of the parent company, J. R. Geigy AG, Basle.

The programme includes an official reception and sight-seeing tour in Basle, visits to the Geigy works in and near the city and a trip from Lucerne through central Switzerland to Interlaken.

These lucky people will thus have the opportunity of seeing how the Swiss end of the business works, to meet some of their opposite numbers, and to see the beauty of some of the finest scenery in Europe. This seems a very original and enterprising way of rewarding long serving members of the company which would undoubtedly prove a popular move if copied by other firms with overseas affiliations.

The longest serving employee in the Geigy party has been with them for 38 years, and the combined service record of the party amounts to 885 years.

Frank Woods has been appointed chief chemist of the Northwestern Rubber Co. Ltd. He was previously with Leyland and Birmingham Rubber Co. Ltd., Polymer (UK) Ltd. and the Koninklijke Shell Plastics Laboratory, Delft

Unsinkable Boats

The *Titanic* was the first ship to be given the name 'unsinkable' but since the boats so described in a recent British Geon bulletin are hardly likely to come up against icebergs, the adjective is perhaps more apposite. The booklet gives details of a method of boat construction from rigid pvc which would gladden the hearts of many do-it-yourselfers and amateur craftsmen. The method, says the booklet, does away with many of the difficulties previously encountered in making boats in plastics materials — expensive moulds, complicated mixing of chemicals and involved finishing operations. Boats can be constructed by the semi-skilled (and who does not flatter himself that he is at least that) craftsman with only the simplest tools. Rigid pvc is a very tough, durable and seaworthy material which does not require painting or any other form of maintenance, will not become waterlogged and should stand up to a fair amount of mishandling without any danger of the budding Frobisher, Drake or Nelson ending in the drink.

Brave New Goodrich

You may remember a passage in Aldous Huxley's *Brave New World* where babies, newly precipitated from bottles, are attached to tape recorders which mutter repeatedly into their ears: 'I'm glad I'm a beta because betas are cleverer than gammas but haven't so much responsibility as alphas'.

B. F. Goodrich (Canada) Ltd. seems to be moving towards this technique of suggestion. The company thinks it needs to be stimulated and so all the firm's employees, dealers and distributors are wearing large lapel buttons proclaiming:

Winners of the 1961 'Keds Rock 'n Roll Championship of Great Britain' — Mrs Thelma Johnson and William Oakes — being presented with a cheque for £100 and the challenge cup by Ralph D. Hunt, deputy managing director of North British Rubber, and J. P. Stephenson, general sales manager, footwear consumer products division. (*See: In the Spin*)

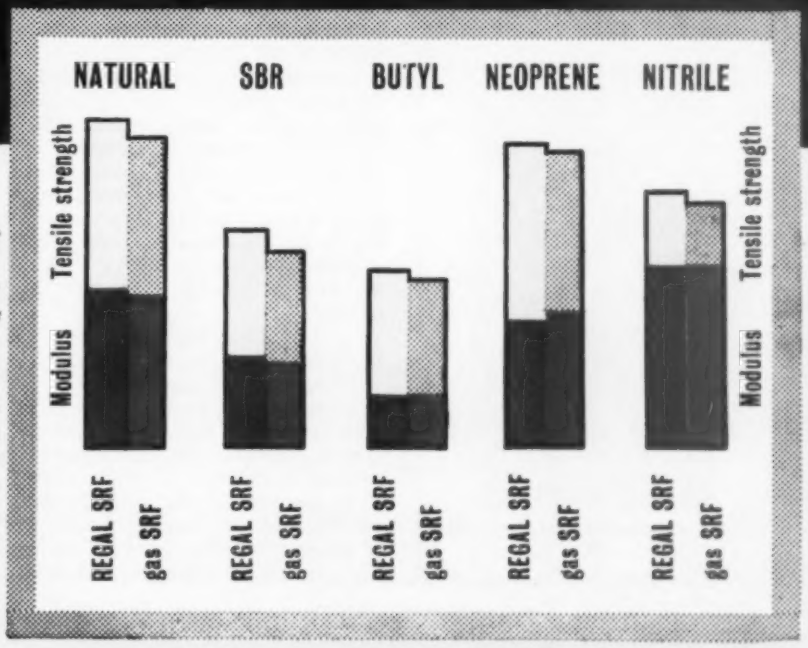
SRF Black from oil?

CABOT

FACTS

REGAL SRF is produced by the new REGAL process — patents applied for — permitting the control of structure at various particle size levels, from oil. Its Particle Size and Surface Area are close to those of PELLETEX and STERLING S, Cabot's long established American gas-SRF blacks. REGAL SRF provides physical properties and processing characteristics typical of gas-SRF types:—

SRF



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Dr R. V. Yohe, president of the company, said: 'The buttons are designed to reflect the positive attitudes of each of us that will bring about prosperity'. The thought expressed by the buttons emphasizes the personal contribution that every Canadian can make to righting the economy, he added.

T. L. Birrell to Leave BX

T. L. Birrell, MA, BComm, FPI, is retiring on June 30 1961, from the board of British Xylonite after 33 years' service. He joined the company in 1928 and was sales manager of raw materials for a number of years. He became sales director of BX Plastics on its formation in 1939, and was elected to the board of the British Xylonite Co. in 1947. Since 1949, he has been managing director of the Halex Division.

Mr Birrell was an original subscriber of the British Plastics Federation Ltd. in 1933, and chairman of the Plastics Institute in 1942 and president in 1952. He has been associated with the Plastics Industry Golfing Society since its formation and is this year's president. He is also a member of the Council for the British Brush Manufacturers Association. He is joining the board of Yarsley Research Laboratories Ltd. at Chessington, Surrey, which will enable him to maintain contact with his many interests in the Industry.

Take-over Talk

There are three Kleemans on the board of O. and M. Kleemann, the bid for which by Socony Mobil was one of the main talking points in the plastics industry this week. (See page 785.) Chairman and managing director is 41-year-old Derrick Kleeman, who has steered the firm very successfully in its spectacular expansion on the raw materials side over the last few years. In the last four years profits have shot up from £220,000 to £636,000.

Ever since the run of take-over bids began in the plastics industry — culminating in Turner and Newall's take-over of BIP, and Distillers acquisition of British Xylonite — there has been speculation about 'who will be next'. The speculators are now evidently turning their eyes on De La Rue, probably the largest independent quoted firm with a considerable plastics business. A little after Socony Mobil made its announcement the De La Rue price went up by 1s. 3d. to 67s. 6d.

Daphne Aldis has joined Fablon Ltd. to handle consumer public relations for the firm's self-adhesive vinyl, Fablon, and decorative laminate, Fablonite

Durie and Miller Appointment

Durie and Miller Ltd. of Haslingden, Lancs., processor of latex compounds and manufacturer of Duralay carpet underlay, has appointed Frank Hill, manager of the Haslingden works, to its board of directors.

Polly Ester Says . . .

'Interferometer — mother-in-law'

THE LEGAL ANGLE

A Director's Liability

By a Barrister

'V. L. Pinnock, MSMA, has been appointed to the Board of Directors of B. and F. Carter and Co. Ltd., the cable, braiding, wire rope and hose machinery manufacturers'. — RPW, December 31 1960.

Congratulations! But I wonder whether this new director realizes the extent of his own personal liabilities for any possible wrongdoings by his company? After all, things do go astray in large outfits, however conscientious the directors, however well organized the business.

Suppose, for instance, that one of the senior employees was to do something stupid or careless and so cause injury to a customer or a member of the public? Or what if the company were to bring out some publication, in breach of copyright, or to cause damage through some inadvertent infringement of a trade mark? Could the director himself be brought to account?

Explosives Issue

There have, of course, been many cases in which directors have been sued because of the tortious acts of their employees. The most famous involved a chemical company. Two of its directors — Mr Feldman and Mr Partridge — were sued because of damage resulting from an explosion, caused by negligence, on land on which the company was manufacturing the explosives.

The result? They were held to be in the clear. 'If the company was really trading independently on its own account', Lord Buckmaster said, 'the fact that it was directed by Mr Feldman and Mr Partridge would not render these directors responsible for the company's tortious acts — unless, indeed, they were acts expressly directed by them'.

So that is rule No. 1. A director is personally responsible for wrongful acts, if he expressly orders that they be done.

Another great Judge put it like this. *'Prima facie*, a managing director is not liable for tortious acts done by servants of the company unless he himself is privy to the acts — that is to say, unless he ordered or procured the acts to be done. . . . If the directors themselves directed or procured the commission of the act, they will be liable in whatever sense they did so, whether expressly or impliedly'.

So there it is. If some tort is committed by an employee of the company, now directed by Mr Pinnock, he should not have to worry—at least in so far as his personal liability is concerned. He can only be brought personally to book if he gave his consent — express or implied — to the wrongful act — or if he actually ordered it to be done.

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VIEWS and REVIEWS

Biting the Hand that Feeds

WHEN a new material has been discovered, developed, and established, out of the money its exploitation provides there is often hired a man of great technical skill who is charged with the job of trying to change its properties, even to make it what it is not.

This goes on in different ways and to various degrees. One example — magnetic rubber — I propose to discuss in more detail some other time, but, from the April issue of *Rubber Age*, I take the following interesting developments.

Slippery Rubber

Page 110 says: 'Quantum Inc. . . . has taken the "rub" out of rubber. . . . Through ingenious chemical treatment processes, it has produced rubber that is slippery to the feel yet retains the elasticity and other desirable properties of natural and synthetic materials'.

This makes possible a new approach to the design of dynamic seals for precision mechanisms and, with further development, would make possible several types of packings, rings, and seals which could function for long periods without lubricant.

One effect should be greatly to increase the service life of rubber seals in mechanically moving parts, to open new ways of avoiding leaks of oil and grease around rotating and reciprocating shafts, and the possibility of making completely air-tight seals on sliding windows and doors.

As far as it has been revealed, the new process consists in graft-polymerizing methyl methacrylate to the rubber surface and then fluorinating with sulphur tetrafluoride in order to produce a 'low dipole force' surface.

Unprimed Bonding

A so-called self-bonding silicone rubber has been developed by General Electric Co. and is reported on page 125. It bonds without a primer through a direct reaction with the metal, to steel, chrome steel, and stainless steel, and other metals are being investigated.

Polyurethane Moulding

From the nature of the ingredients and their reactions, it would seem that casting is the only feasible way of making polyurethane rubber products, but pages 116-7 report that Mobay has produced a new urethane rubber which can be extruded, injection- or transfer-moulded into small products. It is a 'fully-compounded, partially-cured formulation of isocyanate, polyester, and chain-extender, and is supplied in the form of a granular solid'. Although elastic, it is hard, exceptionally tough and resistant to abrasion, oil, and solvents. Typical properties of two of these 'Texin' resins are given in a table.

As might be expected, one of them can be orientated by drawing and curing under tension, giving a monofilament with quite extraordinary physical test figures. For instance, by one drawing process, a monofilament having a diameter of 17-thousandths of an inch is produced having an ultimate tensile strength of 27,000psi and an ultimate elongation of 210%. It is possible that, when the optimum processing methods, times, and temperatures have been discovered, even higher physical test figures will be obtained.

The dry blending of colouring matter with the urethane resin followed by extrusion can be quite effective in securing uniform dispersion and it may yet be found possible to achieve the same result during injection moulding, by means of a special nozzle.

Chemists will be concerned about the life-span of such partially-cured resins; so far, the extrusion formulation has performed satisfactorily after five months' storage in a sealed container at room temperature, giving a product whose physical properties were essentially the same as those of products made from fresh material.

The present technical position following this development work is that while liquid casting of urethane rubber is still the only method suitable for large products (such as tyres) the new extrusion and moulding processes are applicable to heel lifts, grommets, seals, gaskets, tubing, hose, and cable jackets.

Helping Ourselves

British exporters have been getting some hard knocks lately from chastisers in the Press and on television. I am taking no sides because large sections of our own industry have come out fairly well. Not that we can be complacent: I know that some of the main criticisms (such as poor quality and failure to keep delivery promises) do apply to some of us. But, in general, we are as inventive, progressive, and vigorous as most, and more than many.

In this we are helped by a number of general, non-profitmaking bodies: the two Federations, the two voluntary societies devoted mainly to education, and the Research Association at Shawbury. These offer us a lot of help in many ways but not least in nourishing and cherishing the technical vigour of the industry.

Take a minor example which has just come to my notice, namely the publication by the Research Association of *Rubber Products News*.

I have before me the April 1961 issue, Vol. 2, No. 4. It is a well-presented, convenient, duplicated document of some 20 pages of text carrying 116 abstracts of items of information taken from many published sources.

The items, as the title indicates, all concern rubber products — though the term 'rubber' is (rightly) interpreted in such a wide sense as to make the title merely indicative if not inaccurate. They are classified into: adhesives, belting, cables and electrical goods, film and foil, footwear, games and sports goods, hose and tubing, mechanicals, roads, flooring, textile-rubber composites, clothing, tyres, and miscellaneous special applications in aero- and astro-nautics, automobile, building, and packaging.

It is, in a sense, a newspaper. It is as up-to-date as its obvious limitations permit: for instance, in this April copy which I received at the beginning of May, it quotes from the *Adhesives Age* for April 1961. It does not evaluate or comment; it summarizes and repeats. Its items are based on trade pamphlets, on articles and papers in journals, and on advertisements.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

It serves the industry in two ways. It gives a bird's eye view to the man who wants to keep in general touch with developments but has no time for prolonged study of journals, while it is a good detailed basis for the one who seeks modern ideas and stimulants.

Sponges New and Old

Diphenyl ether is a relatively unreactive, ring-system substance, stable towards heat and oxygen. It has recently been studied in the Dow Chemical Co.'s laboratories and the first results, chiefly about an interesting new cellular polymer, are reported by J. D. Doedens and H. P. Cordts in *I/EC* for January 1961, Vol. 53, No. 1, pp. 59-62.

'A series of new compounds, based on the chloromethylation of diphenyl ether, capable of polymerization to either foams or hard thermosetting resins suitable as binders has been developed. These polymers are extremely tough and are flame- and heat-resistant'.

Many of the compounds can be condensation-polymerized in the presence of Friedel-Crafts catalysts, yielding a thermosetting foam 'blown' by the HCl evolved. The set foam has a thermal conductivity about the same as that of cellular polystyrene, its density can be widely varied, and its structure made open or closed.

As expected, one of its most useful properties is its relative non-inflammability. It does not, in fact, flame, but, under strong heat, chars or blackens. (A striking photograph compares its behaviour with polyurethane foam which soon ignites and maintains itself alight while the chloromethylated diphenyl ether foam is only slightly charred and does not support combustion.)

'If the chloromethylated diphenyl ethers are foamed in the presence of inorganic fillers such as glass wool, exploded mica, or rock wool, a somewhat heavier structure is formed which has essentially the same or better fire-resistance properties as the unmodified foam. In addition, the strength of the foams is greatly improved'.

The catalysed mixture can be sprayed onto the inorganic reinforcer and by heat curing a foam-mat can be produced — possibly the basis of a continuous process. Other fillers can be incorporated in other ways.

Because of their fire-resistance and their ability to support a good deal of weight, these new foams are promising as constructional material. Their heat insulating properties are equal to or better than current commercially available materials.

Structural Foams

In the autumn of 1960, a conference of the Building Research Institute was held in Washington, D.C., on the subject of Structural Foams, and much of it is summarized in an article in *I/EC* for January 1961, pp. 58A-60A. The cellular plastics, it is the main contention, enable the production of new designs.

For instance, Dow Chemical Co. research at Purdue University has developed thus: 'Using high-tensioned steel wires as straight-line generators of a hyperbolic paraboloid surface, roofs are constructed by covering the wires with a layer of polystyrene foam board, adding a reinforcing wire mesh over the foam, and covering the sandwich with a thin layer of concrete. Such a foam will support the wet concrete until it hardens, and after removing the wires, it provides a weather-resistant roof surface of strength and rigidity with a built-in layer of insulation and moisture barrier'.

Polystyrene foam is widely used because it is easily handled and fabricated, water-resistant, available (it is said) in a self-extinguishing formulation, and bonds well to plaster and cement. Rigid polyurethane foams are notable for their high strength-to-weight ratio. They can be used as prefabricated panels or shapes, or can be foamed *in situ*.

The foaming of plastics has led to the foaming of metals, especially aluminium, by adding suitable foaming agents to the molten metal. They are not yet commercially available. The article also has some description of cellular concrete and cellular glass.

Expanded Resins

Under the title of 'Résines Expansées', there is a nine-page article by R. Hybre in *L'Officiel des Matières Plastiques* for January 1961, Vol. 8, No. 77, pp. 33-41. It deals with cellular polythene, rigid and flexible polyurethane foams, cellulose sponges, cellular polystyrene, latex foam rubber, silicone sponge, and cellular polycarbonate. It is one of a series of articles and is to be continued.

It is a curious collection of information from various but not exhaustive sources, with no attempt at critical evaluation either technical or economic. Consequently, important major processes in commercial production are scarcely mentioned while exotic laboratory curiosities are given prominence, possibly because eulogistic sales literature has made them sound attractive.

For instance, an abnormal amount of space is devoted to the reactions of isocyanates with castor oil derivatives while there is hardly a reference to the polyether reactions, which are the basis of modern commercial processes. Similarly there is undue space given to the effects of alkyl dithiocarbamates as bactericides and fungicides, and to the supposed catalytic reactions of molybdenum salts.

In the short section headed 'Caoutchoucs', after a mere sentence on latex foam rubber (which the author says was the first commercial expanded material!) the article briefly describes other types of cellular rubbers without clearly distinguishing between 'blowing' by gases evolved from a chemical reaction and 'expanding' by bubbles formed from dissolved gases when pressure is reduced. This is an article of interest to the expert as a museum piece but misleading to the general reader.

Making Amends

The next issue of the same journal makes amends. Under the general title of its regular feature, 'Review of New Processes', the February number of *L'Officiel des Matières Plastiques* brings together a dozen or so items from patents and trade pamphlets relating to 'expanded resin' processes. Matters dealt with include: porous filters for cigarettes, depolymerization of scrap polyurethane foam for re-use, anti-slip underlay for sticking to carpets, sponges containing detergent, and a method of constructing upholstery cushions and mattresses from cut pieces of foam rubbers and microporous polymers.

CHARLES JENNINGS

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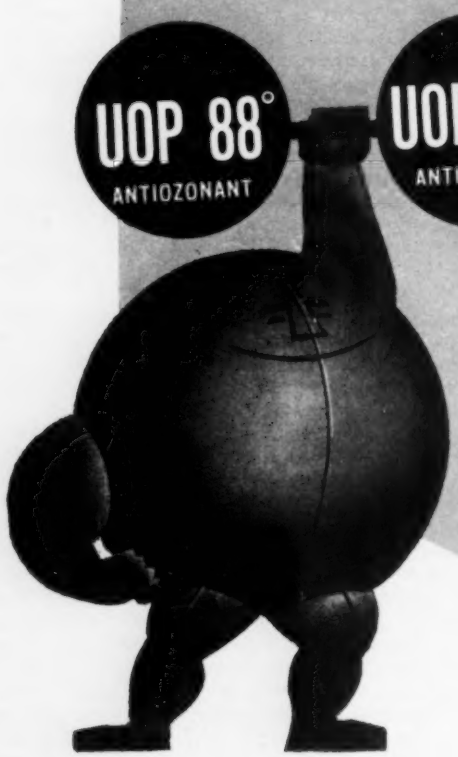
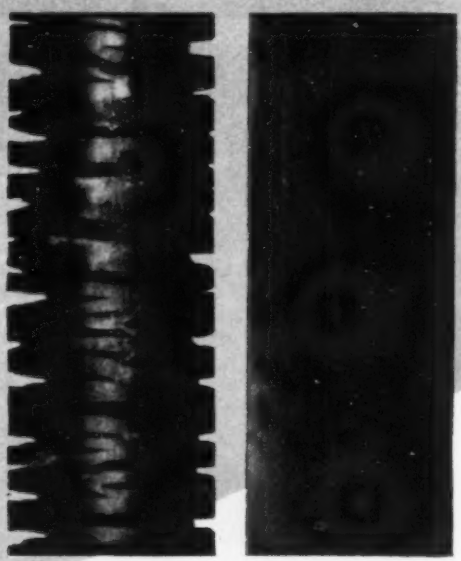
Effect of Curing System on Antiozonant Retention in SBR Stocks after Vulcanization

(All contain 3.0 phr UOP 88; 40.0 phr HAF black)

Compound	Accelerator	Sulfur, phr	% Extractable Antiozonant
1082....	2.0 phr benzothiazyl disulfide	2.0	86.4
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1087....	None	2.0	~100.0
1088....	1.0 phr benzothiazyl disulfide	3.0	74.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1089....	1.0 phr benzothiazyl disulfide	1.0	88.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1084....	1.0 phr N-cyclohexyl-2-benzothiazole sulfenamide	—	—
1093....	1.0 phr diphenylguanidine	2.0	~18.0
1085....	2.0 phr tetramethylthiuram disulfide	—	35.0
1090....	4.0 phr tetramethylthiuram disulfide	—	12.9



The SBR specimens below were exposed to ozone at 100°F with 20 percent elongation for 52 hr. at 33 pphm ozone, then 187 hr. at 63 pphm ozone.



Carbon black—HAF (high abrasion furnace), Curing system—4 phr tetramethylthiuram disulfide; Hours to first crack—7 to 23.

Carbon black—HAF (high abrasion furnace), Curing system—2 phr sulfur, 1 phr N-cyclohexyl-2-benzothiazole sulfenamide. No cracks in 239 hr.

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Look at the two rubber test strips illustrated. Both were formulated with UOP 88 . . . but note how much more effectively the antiozonant worked when accompanied by this change in curing systems—a vast increase in resistance to cracking. The table above the test strips shows how the *proper* accelerator aids antiozonant effectiveness.

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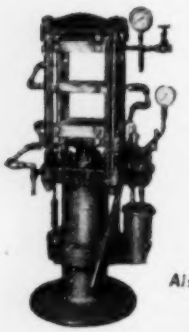
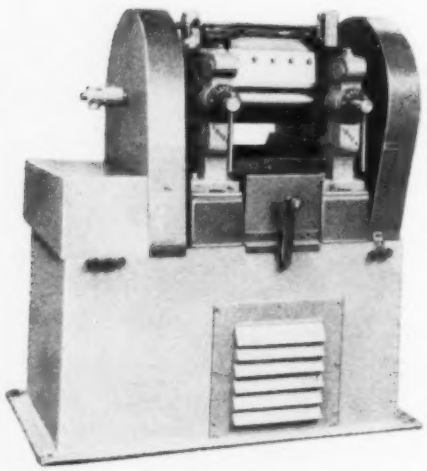


The illustration on the left represents: Steam-heated 2-daylight 12½/25 Ton Press.

On the right:— Double Geared Motor Driven 2-speed Laboratory Mill.



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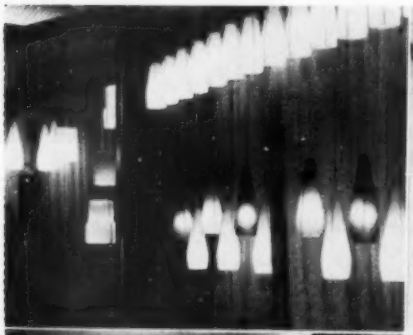
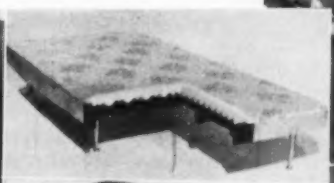
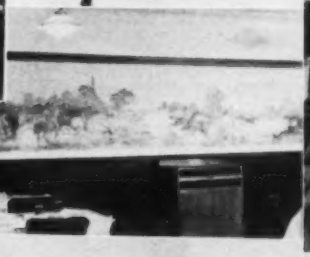
AN RPW SPECIAL FEATURE

Rubber and Plastics in Furnishing

A key to the applications on this page appears on page 804



RUBBER AND PLASTICS IN FURNISHING

Foams and Glass Fibre

NEW MATERIALS ALLOW ELEGANT DESIGNS

By PETER V. CROFTS,
Vitafoam Ltd.

MORE rubber and plastics are being used in furniture now than ever before, yet the potential increase is still vast. This was evident at the recent Furniture Show, where these materials were used in wider and more interesting designs; in fact, the best new furniture uses them extensively.

These products have radically altered the comfort and appearance of new furniture, especially through the use of upholstery that can be slim yet comfortable, and that can be easily made into complex shapes.

Versatile Materials

Leading uses of rubber and plastics in furniture will be discussed here. However, a short list of some of their other uses indicates their versatility: nylon and other plastics scuff-proof surfaces, epoxy resin glues, rubber mounting pads, rubber and plastics skids, many plastics fibres (*e.g.* loop-raised nylon) and plastics-backed upholstery fabrics and plastics surfaces — these indicate the extent to which rubber and plastics are used in the industry. Indeed, probably every piece of furniture made in Britain today is made better at less cost through the use of rubber and plastics. However, there remains a lingering tendency to use outdated upholstering materials through a misguided love of the traditional. This practice is as illogical as it would be to make deliveries with horse and cart.

Foams for Cushioning

Upholstery foams are the most prominent among rubber and plastics materials used in furniture; they are largely displacing spring interior upholstery in furniture and similar applications, such as in motor car seating.

Fyne Ladye settee, where use of latex and plastics foams results in a compact but comfortable seat

The evolution of foam has hardly been abrupt. It was started by latex foam in the late 1920s but had barely tapped its potential market as recently as ten years ago. Manufacturers were reluctant to use it for a number of reasons; they could not be assured of stable prices and were often faced with a demand for pre-delivery payment for both mould and cushions, and with complicated schedules of amortization costs and other charges. Vitafoam tackled both these problems; they helped to stabilize rubber prices through long term contracts with leading Malayan suppliers, who provided latex at a fixed price. They also encouraged wider use of latex foam by offering new mouldings on a simple price-quantity scale, in which they absorbed part of the cost of the moulds. A wide use of standard sized moulds also made it possible to supply cushions in large numbers with a relatively small mould cost.

Not a Substitute

Another drawback was that furniture manufacturers often treated latex foam as an exact substitute for down and spring interior upholstery; new chairs using latex foam were often as bulky as if they had springs. However, designers finally began to create furniture which made use of latex foam's slim comfort. Improvements in the cushions themselves also contributed to their popularity as they evolved from ordinary sheeting to cored slabs for increasing refinement.

The next development in this foam-in-furniture was the use of plastics foam — first as padding and then as cushions. The market for upholstery foam is now divided between latex and plastics foam manufacturers; the coexistence of these foams in the same market has given rise to some very spirited salesmanship.

BSI Specifications

Most furniture manufacturers prefer latex foam upholstery for the main support especially for chair seats even if they use plastics foam elsewhere. Price is a factor here, but the comfort and the feel of the cushioning are also very important. The reputation of plastics foam has suffered somewhat from the misapplication of some foams. Although BSI specifications are being drawn up, the British Cellular Rubber and Plastics Manufacturers' Association have established a set of provisional standards as a guide to buyers and manufacturers.

This Eames Chair shows the simplicity of design possible with glass reinforced plastics

The main issue is the seating quality of the various foams. In this the basic requirements are for minimal permanent set and for an insignificant decrease in hardness over a lifetime of wear. Although ideal softness and resilience is rather hard to specify (if it exists at all), a load-deflection curve comes the closest to being a comfort index of the various foams. In general, the best curve is a straight one, *i.e.*, where resistance to impact increases with deflection. Horizontal sections of the curve indicate bottoming, where the material becomes hard and does not deflect as before.

Natural/SBR Blends

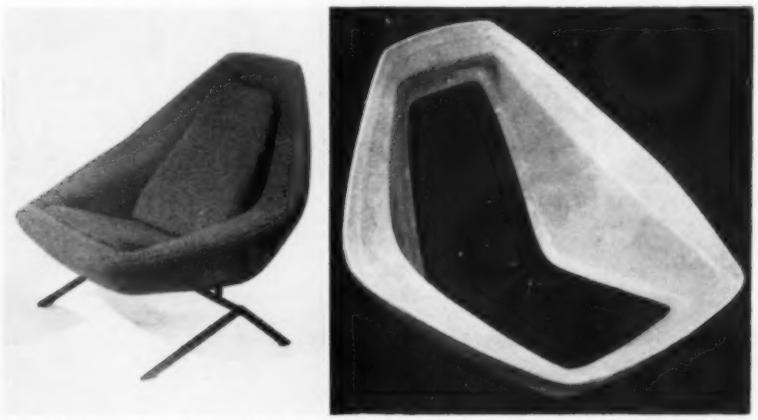
Latex foam has the 'best' load-deflection characteristics, is easily moulded and lasts indefinitely without appreciable setting or hardening. Most latex foam is made to tolerances equal to or more stringent than British Standards Institution specifications. It has a lively feel and is made especially comfortable in thick units by careful core design.

Recent improvements in latex foam production include continuous foaming lines and conveyor systems and

the use of blends of natural with SBR latex. Today the main technical frontier is cost reduction, including the elimination of cushion rejects.

Mattresses

Although foam upholstery is favoured by a large majority of the population, foam mattresses — mostly those made of latex foam — still have less than 10% of the mattress market, despite their overwhelming advantages. This situation is, however, changing. Entire ocean liners are being equipped with them and the Army has just placed a large, precedent shattering order for 67,000 latex foam mattresses.



Combination of glass reinforced plastics shell, rubber webbing and foam cushioning produces this elegant design by Aidron Duckworth

Webbing

Rubber webbing is another important product used by the furniture industry. It provides nearly perfect support for seat cushions; its resilience can be varied by specifying initial tensions (expressed as per cent. elongation) when installed. Once again, this permits slim and comfortable furniture. Indeed, rubber webbing can be very attractive, especially in chair backs where the parallel strips introduce extra interest in otherwise unbroken expanses. Because of its decorative uses both black and white strappings are used.

The two main types of webbing are reinforced and pure rubber webbing. In the former, fibres are placed in criss-cross patterns on different levels, so that they eventually pull against one another under tension and limit elongation. Pure rubber webs can stretch further and offer a smoothly increasing resistance to deflection. Webbing is normally bonded to a metal clip which can be attached in many ways. However, in some applications the webbing is attached with a simple slot and dowel fixture.

The newest development is a single wide rubber platform attached to the chair frame. It contains holes for ventilation and can be attached simply by hooks bonded at intervals around its extremities. The economy of assembly with this platform is obvious.

An exciting and fairly recent development in furniture is the use of glass reinforced moulded resin, which can be conservatively described as revolutionary. Glass fibre's toughness and lightness makes it ideal for furniture. Its singular lustre makes it suitable for exposed components as well as for upholstered shells. A classic glass fibre chair (*i.e.*, one which is well designed and made in large numbers) is a single shell chair by Charles Eames; this has very effectively illustrated the inherent beauty of glass fibre furniture. The Saarinen tulip chair even more dramatically shows the potentiality of the material.

This is just a beginning. Glass fibre is helping to free furniture design from the limitations of traditional material. However, glass fibre has its own drawbacks. Matched moulding (for fast production) requires moulds so expensive that long runs are required to recover the initial outlay. This situation is being eased by a new glass fibre furniture moulding and production service which is specializing in furniture components in order to bring the savings of large scale specialized production even to small manufacturers.

Design Problem

Glass fibre furniture is still relatively new to the market. The main problem in large scale production of such furniture lies in creating the demand for it through good design. Costs provide the leading technological problems — the cost of tooling and of materials (especially reinforcing fabrics).

We have cited a few of the many improvements in furniture production made possible by rubber and plastics. Such developments are good news for everyone concerned. Going (if not gone) are cumbersome ways of making furniture, with dusty and unhygienic natural fibre webbing and padding, masses of springs and thick contours. In fact, furniture can be produced entirely with man-made materials. For instance, in a chair or divan the frame will be of moulded glass fibre, synthetic rubber webbing would be the platform for the SBR rubber foam cushions, plastic foam could provide additional padding and a variety of plastic piled fabrics would provide the covering material. Construction would be inexpensive, involving no finishing or special fastening. The components would also be inexpensively and simply moulded, and the unit would be exceptionally rugged.

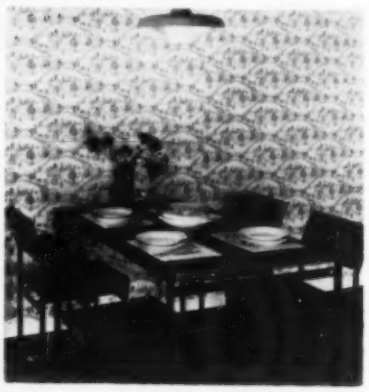
Polymers Open New Fields

This is a fascinating prospect, even though consumers often equate 'synthetic' with 'inferior'. Far from being bad substitutes for traditional

This group is for both outdoor and indoor use. The frames are aluminium, the upholstery slung from the frames is of pvc leathercloth and the table top is of laminated plastics construction

materials, rubber and plastics have opened up new fields for elegance. They are enabling furniture designers to work in a new world of shapes previously denied them. As we have seen, the best of the new 'free furniture' combines propriety with style and grace.

We all benefit from this rubber and plastics revolution, which is raising both our material and our aesthetic standards of living. We are getting more comfort, more elegance and more durability for less money. In this respect, the future of rubber and plastics in furniture is indeed exciting.



This attractive wall covering material, which is of pvc on a cellulose backing, is manufactured by Weber and Schulz, Hamburg-Bahrenfeld

Fitting Out the 'Canberra'

MORE POLYMER FIRMS ANNOUNCE ORDERS

MORE than 14,000ft. of lightweight flexible tubing made by the Glasgow firm of Flexible Ducting Ltd., has been used in the air-conditioning system of the new 45,000-ton P and O liner *Canberra*, due to sail on her maiden voyage on June 2.

The tubing forms an important element in one of the largest marine air-conditioning systems ever installed. Designed by Thermotank Ltd., it involves 70 central air-conditioning units and more than 17 miles of air ducts.

Caulking the teak decks of the 'Canberra' with Bostik caulking compound 2117. Specially designed for teak decks, the compound is being applied with the new Bostik large capacity extrusion gun and mixing equipment specifically designed for caulking

One of the features of the system is said to be an entirely new type of air terminal developed by Thermotank specially for the *Canberra*. These have to be accommodated in very shallow ceiling voids, which is only possible if the ducting can flex to almost 180° while providing an unobstructed flow of air.

Many new design features are incorporated in the mechanized baggage systems on the ship; one of these involves the use of glass fibre conveyor slats.

There are about 2,000 slats in all and they are so shaped that no gaps occur along the travelling surface of the conveyors. In addition, to prevent any risk of the baggage slipping, neoprene inserts are fitted into each slat.

The slats were press moulded by Permali Ltd. of Gloucester, for the conveyor manufacturers, J. Collis and Sons Ltd., London. All the slats were made from needle mat cloth and polyester resin using double impression chromium plated moulds.

The use of glass fibre for these components, which were designed for baggage loads of up to 50lb. per ft. run, offered several advantages. One important consideration was the saving of weight, which permitted maximum operating economy at the normal conveyor running speed of 60ft. per min.

By using mechanical baggage conveyors housed within the liner itself, a great deal of manual porterage will be eliminated with a consequent saving of turn round time in port. And this quicker turn round will enable full advantage to be taken of the faster travelling times at sea.

Among the companies who have supplied flooring for the liner are Semtex Ltd., Runnymede Rubber and Phoenix Rubber. Dunlopillo has supplied 3,250 latex foam mattresses.

PVC Hessian for Upholstery

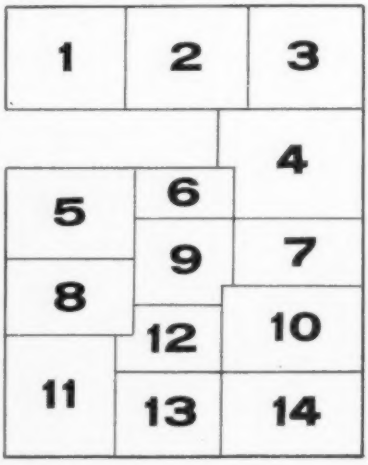
A pvc hessian has been produced by Storeys of Lancaster as a backing for welded upholstery. The vinyl film forms a base on to which can be welded quilted or fluted patterns, while the light, open mesh hessian backing is said to give strength and dimensional stability.

Weldable pvc foam or any other weldable material, may be used as filling which can then be faced in moquette, weldable leathercloth or an unsupported vinyl sheeting.

When high frequency welding with moquette, or to other upholstery materials, the foam becomes softened so that at the point of the weld it flows into the structure of the fabric, gripping it in a firm permanent bond.

Key to Applications on page 801

1. Kitchen unit with working tops in Fablonite, stools upholstered in Superlon, Commerical Plastic's matching material. 2. The arm rests and other parts of this seat for the Vanguard airliner are made from North British Rubber Co.'s Royalite ABS vacuum-formed resin. 3. This new hall at the National Physical Laboratory is fitted throughout with Marley floor tiles. 4. Vinolay, easy to handle, flexible flooring material made by Dunlop. 5. Loralite lampshades are vacuum formed from Iridon high impact polystyrene. 6. Dunlopillo mattress designed for sufferers from back trouble—firm yet comfortable. 7. Olympic bar at the White City stadium in which extensive use has been made of Formica laminates. 8. The canteen of the Sanitas Group in south London—all the chairs are covered in Nappatex upholstery material made by Commercial Plastics. 9. Glass fibre reinforced plastic forms the shell of this Charles Eames chair. 10. Display of chairs and a bed-settee upholstered in Storide pvc manufactured by Storeys of Lancaster. 11. The arms of these garden chairs are moulded in British Resin Products Rigidex high density polythene and the seat and back coverings are woven from Courlene, also a Rigidex product. 12. Folding doors at the Merchant Navy Hotel, Middlesbrough made from Warerite veneered board from Bakelite Ltd. 13. Warerite is also used for the surfaces of this Dorice table and sideboard. 14. The Hope public-house on Wandsworth Common uses Warerite for bar top and table tops



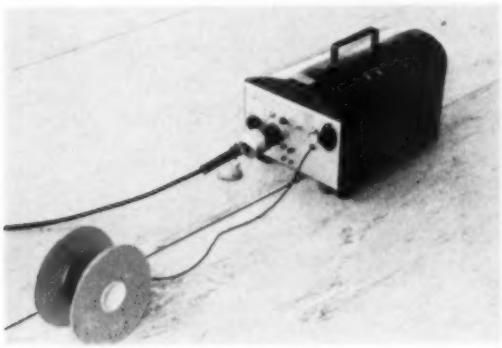
RUBBER AND PLASTICS IN FURNISHING

Polymer Flooring

MANUFACTURER SHOULD BE CONSULTED AT AN EARLY STAGE

By R. DEDMAN, Phoenix Rubber Co. Ltd.

RUBBER and plastics floorings are now firmly established as building and furnishing materials quite apart from their use as replacement or redecorating media, and this fact has made manufacturers concern themselves with structural building matters to a far greater extent. Whether the manufacturer employs his own floorlayers, uses regular trained sub-contractors or sells to another organization ultimately responsible for laying, he cannot avoid maintaining a continuing research programme directed towards the selection of adhesives and consideration of their behaviour under various sub-floor conditions and the improvement of his product generally. The fruits of his researches must be dispensed in the form of advice or instruction to ensure a satisfactory job when laid.



Continuous automatic welding of pvc flooring can be carried out with the aid of the Phoenix 'Mouse'

On the Drawing Board

Depending upon the experience of the architect or contractor, the flooring manufacturer is likely to be involved with his customer at a much earlier stage, even at drawing board stage, than he used to be when floor coverings were regarded more as a furnishing than as part of the building.

This trend is beneficial to both manufacturer and customer, as it enables the customer to explain what he expects the flooring to do and the unavoidable conditions that have to be met. It also allows the manufacturer to state his case regarding his sub-floor specification, finishes adjoining other floors and doorways and changes in level necessary to bring this about neatly.

The manufacturer now has a far better chance to ensure customer satisfaction in new buildings, but poses his sales organization the problem of finding this kind of work very early indeed; in fact usually before actual building has started. Keeping in touch with new building work entails close contact with many architects and contractors and subscription to various information services serving the building industry.

Replacement Work

In the case of redecoration or replacement, which of course consumes a very high proportion of the whole production, the manufacturer or the floor laying company is faced with the situation as he finds it without, except in very large scale rebuilding, being able to influence sub-floor conditions.

Remedial measures, which unfortunately cost more than most people expect, are offered and with sincerity on both sides and due allowance for the fact that all work costs money, a good job can be assured. Uneven floor boards can be sanded, or covered with close nailed hardboard or screeded. Uneven concrete can be screeded, the screeds referred to being latex, cement and sand mixtures, or bitumen emulsions with sand and cement laid generally about ¼in. thick to a smooth and level finish. There are other levelling mixtures based on plastic emulsions which also do a very good job in this respect.

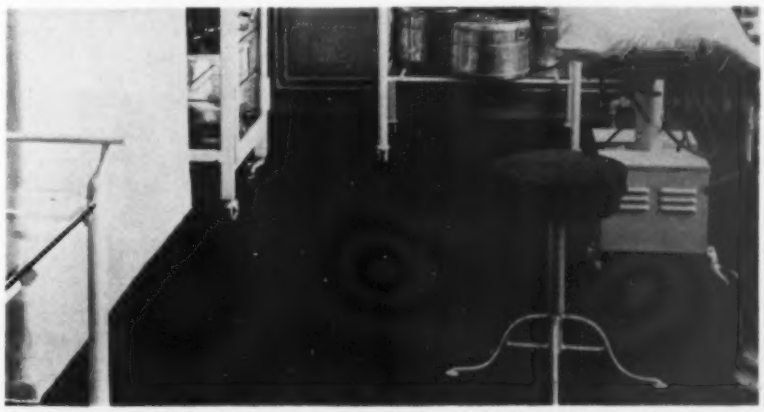
Many Varieties

There are many floorings which all fall under the heading of rubber and plastic and consideration to the whole range will reveal that unless wool carpeting is required, and even this may have a rubber or plastic *in situ* or loose backing, the entire field is covered and the brief resumé of types of floorings shown below may help to illustrate this point.

(a) Hard tiles, containing some pvc to inhibit brittleness and enhance properties generally.

(b) Hard pvc tiles, rich in pvc polymer and exhibiting the hard wearing and resistant properties of pvc.

(c) Flexible pvc tiles, based on plasticized pvc and enjoying the



For hygienic conditions, such as are required in hospitals, and operating theatres particularly, a jointless floor in welded Phoengard such as the one shown here is very satisfactory

inherent good properties of pvc together with quiet tread and non-slip characteristics.

(d) Flexible pvc continuous flooring with properties as for tiles above with the added advantage in some cases of welded joins and the field welded to pvc covings and nosings, *e.g.* Phenco and the Phoenix Mouse.

(e) Clear flexible pvc with a random pattern at varying levels through the thickness giving a 3-D effect.

(f) Felt coated with pvc, usually embossed.

(g) Natural rubber based tiles and continuous sheeting.

(h) Synthetic rubber and rubber/plastic blend based tiles and continuous sheeting.

Honesty and Knowledge

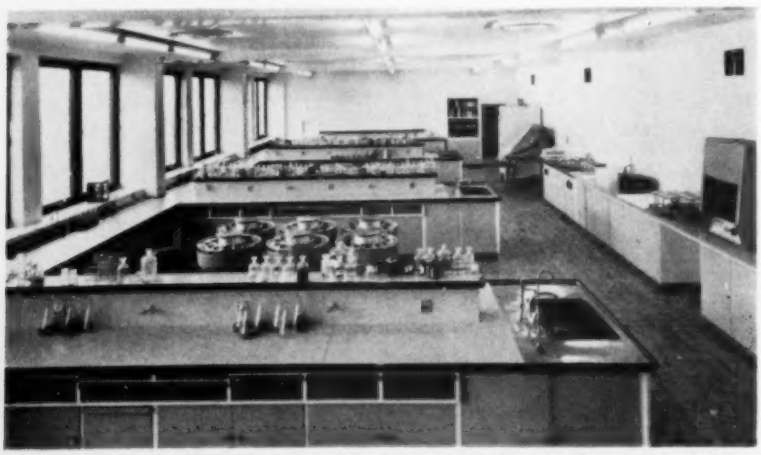
The selection of any of these floorings for the particular job in hand is sometimes not very easy for the customer, and the whole trade benefits or suffers according to the integrity of each manufacturer or his agents.

Over the recent years, one has heard so many times that 'rubber flooring is no good, it perishes, it's old fashioned'. We have also heard that 'this plastic flooring is no good' because it gets dirty when it is not cleaned or has some other shortcoming that the magic word 'plastic' should overcome.

We in the trade can see clearly that general remarks such as these, without qualification, are quite untrue, but we must put ourselves in the position of the non-technical buyer who may well have had a bad experience. Honest selling and an intimate knowledge of the builder's problems must be the aim of the modern flooring manufacturer.

The future for rubber and plastics floors should be very good when one considers that in our industry we are able to modify our compounds to enhance particular properties and are supported by raw material manufacturers who are constantly researching into new and improved basic products.

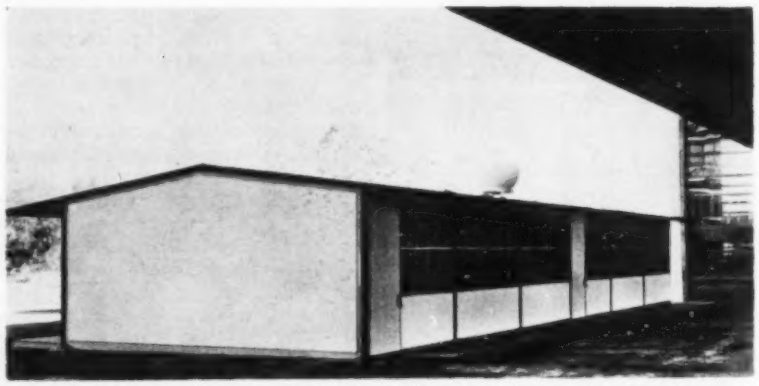
By using his own skills and availing himself of up-to-date raw materials, the flooring manufacturer should be producing an ever improving product, and close contact with the building industry and sympathetic interest in its problems will ensure its continued expansion.



The laboratories of Sandoz Products Ltd., Leeds, in which extensive use has been made of Warerite laminated sheeting for bench tops and shelving, where cleanliness and chemical resistance are important

GRP in Mexico

EXTENSIVE FURNISHING AND BUILDING APPLICATIONS



Glass fibre supplied by Owens-Corning Fiberglas Corporation is extensively used in reinforced plastics applications in this school building, 20,000 of which are to be built in Mexico to assist education in rural areas

GLASS - REINFORCED plastics will play an important role in a major construction programme involving 20,000 prefabricated rural schools to be erected by the Mexican Government over the next ten years.

Each school building is 59ft. by 20ft. and in addition to a large classroom which will accommodate 50 pupils, provides complete living quarters for the teacher and his or her family.

One application of reinforced plastics in the building, said to be the first of its kind ever produced, is a completely moulded sanitary unit with a single-feed drain principle. It is incorporated in a reinforced plastics partition which divides the bathroom and the kitchen of the teacher's quarters. The partition is constructed of two panels with a space between to hold water for servicing all of the sanitary fixtures with a single water feed. The basic water supply of the building is provided by a spherical, reinforced plastics tank on the roof.

Costly Network Eliminated

Moulded into the partition on one side is a kitchen sink, and on the opposite side a toilet and lavatory. Below the water reservoir is a separate reinforced plastics conduit which carries waste water to a septic tank. The system eliminates the need for a complex and costly network of pipes and connexions and is produced by Molde SA, Mexico City, which also provides the roof-top water-storage tank.

Another unusual application of fibre glass is made in the window panels. Working with the Mexican Ministry of Public Education, the architects specified translucent glass-reinforced polyester panels in many of which pictures of Mexican historical figures and educational motifs are embedded. In addition, window vents, too, are made of glass-reinforced acrylic-polyester.

RUBBER AND PLASTICS IN FURNISHING

Decorative Laminates

INITIAL HIGH COSTS OFFSET BY DURABILITY AND VERSATILITY

By H. S. NEWCOMB,
Bakelite Ltd.

AT the risk of distressing antique lovers everywhere who must deplore present day furniture and the increasing rarity of original 'pieces' and settings, it can be claimed that decorative laminated plastics make an attractive and important contribution to modern or contemporary furniture.

While our ancestors, provided that they were sufficiently wealthy, were able to indulge in the rich if sombre hues of solid Spanish Mahogany (of necessity tended with loving and arduous care by domestic staff) our contemporary 'Mahogany' furniture is only skin deep as it were. It is a skin, however, as insensitive to abuse and damage as that of an armadillo.

Design Simplicity

It must be admitted that costly furniture throughout the ages (albeit during relatively short periods) by its use of traditional material, original design, sense of quality and detail inherited by both the craftsman and designer, has a certain charm and preserves the majesty of a bygone age. Today, of course, there is less detail and ornamentation, a basic simplicity of design, an emphasis on suitability for function and direct construction as dictated by the machine.

There is a new rationalism in design brought about by an increasing study of new man-made materials, improved production processes, an awareness of economics, and an appreciation of consumer requirements appropriate to this technological age and generally improved standard of living.

The ever-growing contribution of laminated plastics to the progress of the industries concerned has reached its present position over a period of about 25 years. Originally, there was a small range of decorative laminates from which to choose. These were first introduced and used for decoration purposes — mainly for artistic and luxurious applications, such as in the Coronation Scot and the Queen Cunarders, and also for furniture worktops and wall coverings.

World Wide Uses

Today, decorative laminated plastics represent a vigorous and still growing industry as evidenced by the increase in the number of materials available, the multiplicity of uses and applications, and the value of the business involved. Still used for furnishing of luxury liners throughout the world, other applications also include furniture surfaces and wall coverings in the less majestic but equally important hotel, council house and cottage.

The latest issue of the appropriate American NEMA Standards Publication gives the following definition of decorative laminates: 'The materials can be defined as thermosetting laminated sheets intended for decorative purposes. The sheets consist essentially of layers of a fibrous sheet material such as paper, impregnated with a thermosetting condensation resin and consolidated under heat and pressure. The top layers have a decorative colour or design. The resultant product has an attractive exposed surface which is durable and resistant to damage from abrasion, mild alkalis, acids and solvents. Sheets are available in a wide variety of colours, decorative designs and surface finishes. They are used for good appearance and functional performance under hard service'.

Melamine Surface

Under various trade names, the decorative architect and designer, the furniture manufacturer, and not least the very important domestic consumer, know the present melamine surfaced high pressure decorative laminate as one of the finest products ever produced by the plastics industry.

In the early days, the patterns and colours available represented a handful of wood grain patterns and several plain colours, in all cases confined to dark shades by reason of the types of resin available at that time. To give some idea of the technical progress made, one supplier alone today offers 150 differing effects in a wide variety of colour and patterns and grades and this figure is exclusive of special effects to customers' requirements.

Food and Hygiene

Following these early applications, and for some years now, the materials have been a specified finish for working surfaces of counters, desks and tables, and the long term protection of furniture and wall surfaces, thereby superseding paint, wood, linoleum, leather and similar traditional materials. During recent years, the

Cabinet-type trolley by Besway Manufacturing Co. Ltd., surfaced with Warerite

implementation of legislation such as the Food Hygiene Regulations, has accelerated their use in kitchens and food handling premises.

However, it is not only in public buildings or transport and commercial applications that the products are extensively used. The domestic furniture manufacturing industry and the 'do-it-yourself' householder consume considerable quantities. Furthermore, whereas the laminated plastics furniture component was originally confined to horizontal tops or work surfaces, its use has been gradually extended to cover vertical surfaces such as the complete surfacing of bedroom suites and kitchen cabinet fronts.

The availability of exclusive patterns, often representing the reproduction of authentic and exotic wood grain effects, or the incorporation of special pictorial and colourful motifs and murals is particularly attractive to that section of the furniture industry which has recently become a 'fashion' industry in terms of annual or frequent periodic changes in styling.

Durable and Clean

The durability of the decorative effect of laminated plastics is a function of, and largely dependent on, the quality of the surfaces. Currently, high pressure laminated plastics produced by the larger manufacturers employ melamine resin surfaces in both glossy and satin finishes, which are extremely hardwearing and easy to clean.

Where used for furniture tops, satin finishes are generally recommended by reason of their ability to conceal surface abrasions and frictional marking caused by the wear of sliding crockery or cleaning materials and methods.

Such finishes also reduce the risk of undesirable reflections and conceal finger marks. They are unaffected by spilt liquids and foodstuffs, hot or cold, as well as by detergents or solvents which may be used for cleaning. For many vertical surfaces, glossy finishes may be preferable in that they can enhance the appearance of the built-in colour or pattern. The surfaces are also less receptive to scuffing marks from careless feet and cleaning mops, less retentive of surface stains or dirt deposits, and have a more hygienic appearance and permit increased light reflections. Examples where gloss finishes can be advantageously used include vertical surfaces in bathrooms, toilets, kitchens and hospitals.

Special Grades

Some manufacturers supply a grade which is guaranteed to prevent permanent marking or damage from the effects of carelessly discarded cigarettes. This grade is particularly recommended for bar and counter tops, office furniture and bedside tables.

Melamine surfaced hardboard in Australian walnut pattern is widely used in this office

New materials recently introduced include postforming grades which promise revolutionary changes in the elimination of square edges and corners, giving the designer and fabricator more freedom in shape and manufacture. Good examples of this technique include small radius edges at the ends of kitchen counters, table, desk and furniture tops with radiused front and back edges, coves and cornices for panelling.

Bonded Veneers

Although available and used in a wide variety of forms, decorative laminated plastics, as produced by the manufacturers, comprise a thin veneer which requires bonding to plywood or similar supporting material before conversion by the specialist fabricator into furniture components.

High quality plastics veneered boards are usually press veneered using synthetic resin adhesives. However, the recent development of a range of pressure sensitive adhesives has made possible the application of the materials on the job, rather than in the furniture manufacturers' or woodworking shop. This has undoubtedly opened up tremendous possibilities for the do-it-yourself enthusiasts who are attracted to this pre-decorated form of covering material which can add the professional finish to what otherwise may appear to be a poorly finished piece of furniture or panelling.

Wallboard

A recently introduced type of laminated plastics sheet is in the form of a decorative surfaced wallboard which requires no plywood backing and which can easily be fabricated and erected by the builder or handyman to provide wall panelling, splashbacks, bath panels, etc. It is par-

Bathroom in the Berg ranch house at the 1961 Ideal Home Exhibition, panelled throughout with palazzo marble pattern laminate

ticularly suitable for on-site renovation work such as the modernizing of bars, counter or reception desk fronts, the flushing over of old-fashioned panelled doors, building-in of recesses to provide enclosed storage space, the boxing in of banisters, unsightly wash basins, plumbing services. There are many other uses for this easy-to-work decorative material with structural properties.

Royston bedroom suite made by the Ronson Furniture Group surfaced entirely with laminated plastics veneers in French rosewood print

Economics

The economic advantages of using laminated plastics compared with traditional materials are not at first readily apparent. Dependent upon the quality and pattern effect of the laminate used, the prime cost may be twice that of a wood veneered and polished furniture component. On the other hand, the use of plastics contributes additional and much improved properties in terms of durability and suitability for many purposes, spectacular and unusual decorative effects and even new products not practicable with wood veneers — all with the guarantee of long term protection and low maintenance to the consumer.

Low Pressure Laminates

Other relatively new and similar products which have been developed include *low pressure* laminated decorative sheet materials. These comprise plywoods, chipboards or hardboards on the surfaces of which synthetic resin impregnated papers have been moulded at pressures which are a small fraction of those used for the conventional high-pressure laminate. The general appearance, however, can be quite similar to the high-pressure laminate veneered board, but the serviceability is vastly different. This is because the low-pressure laminate is relatively soft and usually comprises a thin surface layer. It also has low impact strength and can readily be dented or fractured. Similarly, by reason of the thin surface layer, the quality of the surface finish is dictated by the quality of surface of the core materials. However, they are likely to be suitable for certain types of wall covering which do not have to stand up to severe usage.

Furthermore, there appears to be no reason why their use should not be combined with high-pressure laminates where, for instance, the conventional product could be used to surface the skirtings or the lower part of panelling, and the low-pressure cheaper product provide the upper portion.

Competition

In addition to competing with traditional materials, decorative laminated plastics have other competitors for furniture surfacing. These include adhesive backed vinyl film or foil-covered plywoods, metal and hardboards. The range of designs available include patterned and textured effects which reproduce everyday materials such as leather, textiles and wood veneers. Like decorative laminates, the materials are easy to clean and install, but they are not robust, have relatively soft surfaces and would probably fail under certain conditions of usage where heat, abrasion and solvent resistance, are involved. Another disadvantage is the ease with which static electricity is generated, resulting in the attraction of dirt to the surfaces.

Coating Resins

A much more recent and revolutionary use of plastics finishes for furniture surfaces is the change over from sprayed cellulose lacquers to polyester coatings. In cases where these finishes have been used, it has involved redesigning and/or limiting the designs to 'knock down' assembly structures whereby the furniture component comprises flat slabs to permit the usual curtain coating method of applying the resin, which is subsequently buffed to the distinctive mirror gloss finish. Although, to some extent, this new processing technique has been aided by the concurrent change over to chipboard as the basic supporting material, it is unfortunate that the processing equipment and technical control represent a costly investment to the average furniture manufacturer and the finish has not yet found a really wide acceptance.

Future Prospects

Finally, it is highly probable that the future will see more remarkable developments in plastics. The consumer and fabricator will be expecting, if not demanding, complex structures probably made from sawdust, wood chips, or other cheap raw materials. Mixed with synthetic resins this should result in surfaces with new, improved and virtually unlimited decorative effects plus functional properties at a reasonable cost.

Expanded Plastics

It is also probable that expanded plastics of the rigid type, used either in slab form or foamed *in situ* (in either case incorporating decorative surfaces) may provide a more popular furniture material, bearing in mind the advantages of light weight and low cost. They are in fact already used to some extent by aircraft manufacturers for furniture and linings, as well as for domestic appliance table tops. At the present time, a number of furniture manufacturers are experimenting with such products for carcases of wardrobes, sideboards, and similar structures.

Floating homes, made from converted 'narrow boats' make extensive use of laminates for walls, working surfaces and cupboard facings

RUBBER AND PLASTICS IN FURNISHING

Coated Fabrics and Sheeting

SHEET AND FURNITURE MANUFACTURERS CO-OPERATE

By PETER CLARKE,
Storeys of Lancaster

IN the past the furniture industry has been slow to accept the use of plastics materials. However, with the birth of the Furniture Development Council, increasing automation within the industry, and the need to keep down costs in order to fight competition, individual companies are tending to work more closely with the leading manufacturers of plastics sheetings and laminates.

Of all the coated fabrics, those using pvc are easily the most serviceable for the upholstery trade, principally because of their high flex resistance and because they are not liable to deteriorate appreciably with age. Maintenance is simple as they can be kept clean by occasionally washing with either soap and water, or a mild detergent solution.

Many Styles

Coatings of pvc lend themselves to an extremely wide variety of styling. It is possible to produce plain self-coloured materials embossed in various grains, and to combine attractive printed effects with these embossed patterns. The more conventional 'antique' or leather-like finishes are also easily reproduced on pvc leathercloths. Colour is no problem and all have a high degree of light fastness. One major attraction is that pvc coated fabrics have good abrasion resistance and will withstand many years of hard wear.

The choice of fabrics is closely linked with requirements of BS2601: 1955 which lists four grades of finished leathercloth — Grades A, B, C and X — the principal differences between the grades being in the strength and weight of the fabric, and the weight of the coating applied.

The lowest grade, Grade C, calls for a minimum fabric weight of 3.3oz./sq. yd. and a minimum coating weight of 6oz./sq. yd. This quality is intended for the unsprung portions of furniture, where the fabric is not required to take a large strain. The principal uses are for loose seats, dining chairs and kitchen stools.

The higher grades, A and B, call for stronger fabrics, and are intended for sprung portions of furniture. Three-piece suites and office furniture are frequently made from these grades.

Grade X is a heavy duty material, and on a fabric of 7½oz./sq. yd. minimum weight and coated to an overall weight of 20oz./sq. yd. This quality is often specified by Government Departments where a first class product is required.

In all cases, cotton fabric of simple construction and with the strength properties roughly the same in warp and weft direction, is the basis of the final product.

Unsupported Sheet

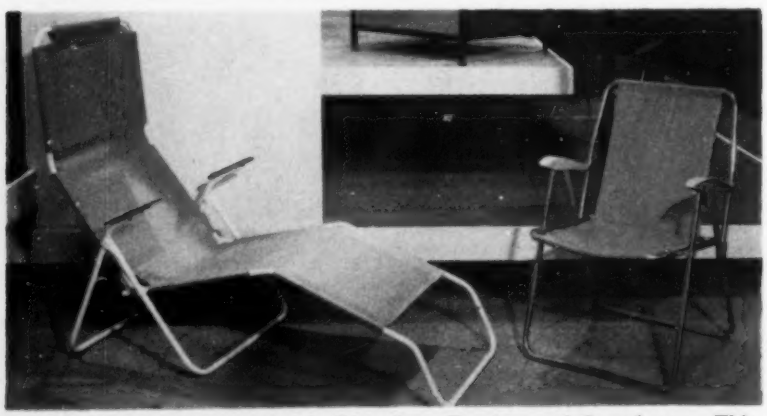
It should perhaps be mentioned here that there is a growing use of unsupported calendered pvc sheeting instead of Grade C pvc leathercloth for such applications as kitchen furniture. This material is usually employed in conjunction with a foamed plastic, which renders unnecessary the need for a reinforcing fabric. Contemporary printed effects are available, and it is possible to afford complete protection of the print against all abrasion by laminating a film of transparent pvc over the printed design, and fusing together the base and protecting layers by heat and pressure.

In the last two to three years the part played by Storeys of Lancaster in the provision of pvc sheeting in specialized forms for the furniture industry has been steadily growing until now the company is one of the main suppliers. Their interests lie under the following headings:

Kitchen Furniture

As mentioned above there is a growing demand for unsupported sheeting until now it is estimated that as much as 90% of the trade is in this form. The use of this type of sheeting has been developed by Storeys in conjunction with Messrs William Steel. This latter company had begun to import the material from the US but at that time there were dollar restrictions and they approached Storey Bros. and Co. Ltd. with the request that they make a similar material. There were many advantages attached to unsupported sheeting but, at that time, due to the lack of welding equipment in many furniture factories, it was very little used. On an inexpensive article like a kitchen chair which lends itself to welding techniques, instead of upholstery in more traditional fabrics or supported pvc, the use of welding cuts down both time and costing on the job. This is particularly important in the furniture trade where upholstery time forms such a large proportion of production costings.

The trade uses an .012in. unsupported sheet which is stronger from a wearing point of view than the lower grade of leathercloth. A main factor is its extensibility. Kitchen stools, which are used for a variety of purposes in a household, are ideal



Garden furniture covered with Plastolene Terylene reinforced pvc. This material, available in many colours, is strong and impervious to all weather conditions

examples. The housewife can stand, if necessary in stiletto heels, on a stool covered in unsupported sheeting with impunity as the material will stretch with her weight and then come back — a supported material would probably tear.

Uniflex Heritage designed sofa covered in Auralan, a material designed for use in upholstery

Complaints on the score of tearing or stretching, even after years of wear are extremely rare. Any faults reported would appear to be in connexion with staining or poor welding.

Sealed in Patterns

On the question of quality, among the 0.012in. range of unsupported printed pvc, protected or 'sealed in' print such as Storey's Storvic de Luxe, are available, which means that the furniture can be scrubbed with detergents or abrasives without damage to the pattern. Manufacturers are able to offer a very wide range of decorative finishes as certain effects which they could not use hitherto, such as metallic inks and metallic particles which would cause flashing on the electrode, making welding impossible. The incorporation of this clear protective sheet on many upholstery materials provides its own insulation.

From the point of view of economy of production, all these materials are produced in widths of 51in., which enables a manufacturer to cut three 17in. chair seat widths which is now standard practice in the kitchen chair trade.

Matching Laminates

Modern kitchen furniture can now be supplied with upholstery materials specially designed by the plastic sheeting manufacturers to match various decorative laminates — the first introduced by Storey's being in conjunction with the Warerite Zig Zag. There is now a range of seven different matching designs embracing the use of Warerite, Formica, Decorplast and Arborite. The use of matching Storvic has spread to vertical surfaces and can be found on doors, walls and other non-working surfaces. It is fair comment to say that this matching in of designs has been a valuable boost, not only to the sale of pvc coated fabrics and sheeting materials but also to the products of the kitchen furniture manufacturers, and to the contract suppliers to hotels, ships and many other outlets.

In this field, particularly in that applicable to the manufacturers of dinette furniture, there is a very marked trend towards special effects. An excellent service can be rendered by the upholstery material manufacturers such as Storeys who have taken existing designs out of their other ranges so that their customers could have these matched by the melamine manufacturer. On standard effects the melamine is matched by Storeys. As this company makes its own printing rollers, new designs can be created comparatively easily.

The Storvic range covers flexible pvc sheeting in gauges of .008in. to .070in. While, of course, the detailed physical properties such as tensile strength and tear strength depends on the gauge, stiffness and formulation, there are a number of features common to all types of sheeting: (a) Freedom from tackiness (except in the case of highly polished finishes); (b) Fastness of colour to rubbing and washing; (c) Fastness to light equivalent at least to the No. 5 Blue Standard of the Society of Dyers and Colourists; (d) Retention of emboss, up to temperatures of at least 100°C.

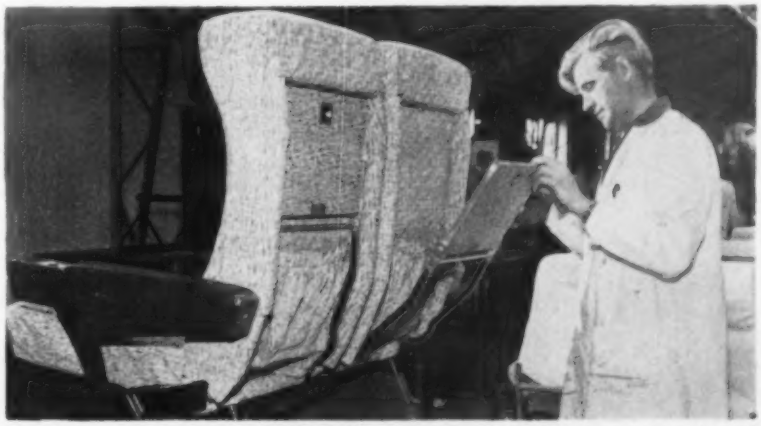
Sheetings of this type can be cleaned by wiping down with a damp cloth. At intervals, it may be necessary to clean it more vigorously using either an abrasive cleaner or a nail brush with soap or detergent and water — and will withstand this type of treatment almost indefinitely. It is important, however, to remove any excess of soap or detergent with clean water — no attempt should be made to use solvent based cleaners. Pvc sheeting should never be polished as several types of wax polish and furniture cream have adverse affects.

Dining and Bedroom Suites

A standard range of Grade B and C leathercloths are made by Storeys known as Storide. All the prints, with the exception of the ink embosses, are protected with a clear sheet, in the same way as for unsupported sheeting.

It is an interesting fact that three piece suites using leathercloths are more popular in the North of England and in Scotland. The ranges available incorporate many printed effects and are becoming widely accepted as first class leathercloth. Its ease of cleaning and hard wearing qualities, combined with gay and colourful designs, appeal particularly to housewives in the industrial parts of the country.

Storide is also sold in large



Storide, complying with BS2601 grades A and B, is here being used for aircraft seating

quantities on the export markets, many of which do not accept British standards and demand an even higher grade. In order to avoid manufacturing two grades, only one is produced in the higher quality for both home and export markets.

Medical Benefits

Quilted sheeting is being used in increasing quantities to decorate bedroom units, in particular headboards, linen baskets and ottomans. Divan bases, upholstered in leathercloth, make a practical change from the usual tickings. Manufacturers of mattresses are using pvc for hospital and other medical use, childrens cots and beds — the material is particularly beneficial to those suffering from asthmatic and bronchial conditions and has been generally endorsed by the medical profession.

Undoubtedly the biggest new potential use for pvc sheeting, both supported and unsupported, lies in the field of contract furniture for offices, hotel and institution uses. Hide effects and plain colours are most in demand by architects and interior decorators, who have to combine hard wearing qualities with a highly decorative appeal. It has been estimated that in 1961 more than £1,650m. will be spent on new buildings. It does not require a mathematician to work out the equally large sums which will be spent on decorations and furniture. Supported pvc will be used more and more in the future on wall coverings, built-in fitments and wherever the traffic is greatest.

However, the contract field usually calls for the heaviest grade, together with special designs and embosses and large quantities of specially formulated material is finding its way into the new liners and hotels.

Garden Furniture

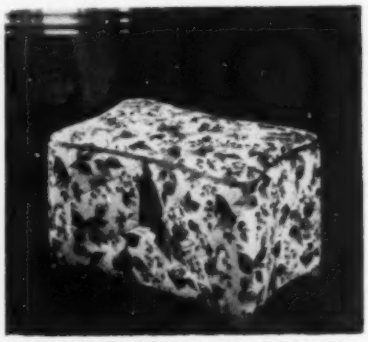
New materials are now appearing such as Storeys' Plastolene which consists of a sandwich of two layers of pvc and Terylene net and this is being tested by various manufacturers for particular use in outdoor furniture. As it can be welded or stitched, and is completely rot proof, it has obvious advantages. Designs are variable, ranging from plain colours through to stripes and florals, and of course it is quite possible to have different colours on either side. The colour fastness is vastly superior to canvas and Plastolene does not stretch, having an excellent recovery tendency — neither is it absorbent. Garden chairs and couches using this material can be left out in all weathers, and require only wiping down to keep them in first-class condition. The Terylene sandwich gives an interesting texture to the material as well as a good grip quality.

Storeys of Lancaster are taking an ever increasing interest in general developments in the furniture industry and are co-operating with manufacturers in their problems. Together with the manufacturers of vacuum covering machinery many experiments are taking place, particularly in upholstery techniques. The recent announcement of the weldability of leathercloth used in conjunction with pvc coated hessian means that many more manufacturers will be installing welding machines and increasing their output and reducing costs.

Manufacturers are also looking into the possibility of inflatable upholstery — Seagull Products Ltd. have had a large success with the 'Puffin Pouffes'.

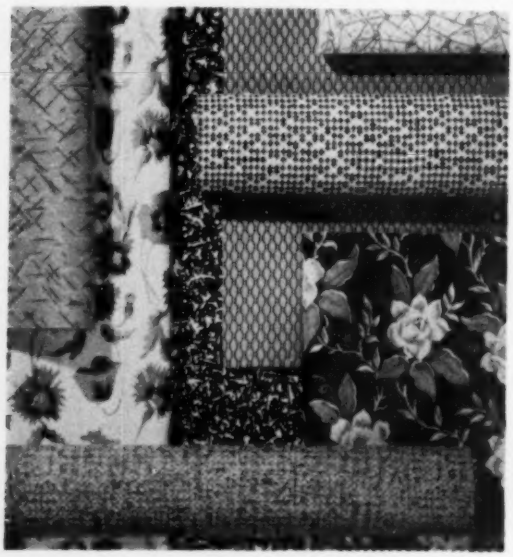
Technical Service

In 1960 Storeys of Lancaster formed a Technical Service Department, whose staff is at the disposal of manufacturers to assist them in their experiments in the use of these new materials. Another special feature is that the facilities of Storey's laboratories are available to customers who wish to submit samples of waddings, packaging materials or accessories for their advice about their suitability for using with pvc sheetings. Many types of wadding contain proportions of oils and greases which are liable to migrate into the pvc sheeting and cause discoloration, particularly upon subsequent exposure to light. Certain other types of padding material are free from this defect but, in their own interests, customers should check carefully that padding materials are suitable. Many types of polyurethane foam are satisfactory but this is not true of all brands.



This ottoman linen basket is lined inside and out with Stor-Decor, a rayon pvc sheeting

When packaging articles made from pvc, care should also be taken and advice sought. Coloured materials should be avoided, and any wadding should be oil free — staining has occasionally occurred with certain types of cellophane and very rarely with some grades of polythene — kraft paper is normally satisfactory. It is also advisable to avoid direct contact between some pvc sheeting and rubber.



Supported and unsupported pvc upholstery fabrics showing the wide range of finishes and designs possible

PVC Handrail

Osma Plastics Ltd. is now manufacturing a pvc handrail, designed to fit the three standard sizes of metal core rail now in general use.

Called Osmarail, it is available in a total of 14 different colours. Eight are British Colour Council recommendations and the remaining six are supplementary colours to match those of similar known products.

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COMPANY MEETING

The Rubber Growers' Association

PLANTATION INDUSTRY'S FUTURE DEPENDENT ON INCREASED PRODUCTION AT LOWER COST

Growing Development of New Materials · Competition with Synthetics Now a Matter of Economics

W. ANDERSON ON ROLE OF PRODUCERS, GOVERNMENTS AND ORGANIZED LABOUR

THE annual general meeting of The Rubber Growers' Association (Incorporated) was held on May 19 in London. Mr W. Anderson, the chairman, presided and, in the course of his speech, said:

Production of natural rubber in 1960, although less than in 1959, was of the order of 2m. tons and was thus higher than in any other previous year.

Consumption of natural rubber in 1960 was also of the order of 2m. tons,

W. ANDERSON
retiring chairman, who presided

but was, however, roughly 125,000 tons lower than the record figure achieved in 1959. About one half of this drop in the consumption of our product was due to smaller imports by Communist countries. So far as the non-Communist world was concerned total new rubber consumption in 1960 was roughly 100,000 tons above the previous record of 3¼m. tons reached in 1959. Whereas in 1959, however, less than one half of the non-Communist world's consumption was synthetic rubber, in 1960 the percentages of natural and synthetic rubber consumption were reversed. The year 1960 was, therefore, significant in that for the first time under peacetime conditions more synthetic rubber was consumed than natural rubber.

New Stereo-Regular Synthetics

This encroachment by synthetic rubber is the more disturbing when it is realized that it was made by what may be described as the conventional synthetic rubbers, principally the so-called styrene-butadiene rubber or SBR as it is usually designated. The past year has, however, seen the commencement of the commercial production of the new stereo-regular synthetic rubbers. These new rubbers fall into two broad categories, cis-polyisoprene or the so-called synthetic 'natural' rubber and cis-polybutadiene.

Cis-polyisoprene is chemically identical with the principal constituent of natural rubber and it is claimed that it should be capable of replacing natural rubber completely. Cis-polybutadiene, on the other hand, is not regarded as a complete replacement for natural rubber but is likely to find use on an extensive scale as a diluent for natural rubber.

At the moment it may be true that neither of these new materials has been perfected but it would be a mistake for us to assume that this will always be so. I feel it would be imprudent if we did not regard these new stereo-regular rubbers as providing the means of replacing natural rubber in every field of rubber consumption.

Importance of Making Natural Rubber Price-Competitive

All this may sound somewhat depressing but the situation has been long foreseen. For many years now my predecessors in their addresses to our annual meeting have referred to the possibility of the development of newer and better synthetic rubbers and the importance of making our product price-competitive. These new synthetic rubbers have now been developed and we can no longer count on the superior technical properties of natural rubber as being sufficient to ensure its continued use. It is no longer a question of superior or inferior properties, from now on it is simply a matter of economics. The material which will obtain the principal share of the world's rubber demand is the material which is available at the most competitive price. A reduction in costs so that we can always supply demand at a stable price, even if need be at a low level, should be our goal.

I know that some people may disagree with me and may feel that the production of new types of natural rubber will save the day. I would remind these people that the advent of cis-polyisoprene means that whatever new form of natural rubber may be developed, it can, if not at the moment, eventually be duplicated by synthetic 'natural'. If, therefore, any attempts are to be made to develop new types of natural rubber it is an essential prerequisite that natural rubber must be competitive in price.

Whatever way we look at the future, therefore, it is quite clear that we must increase our productivity and reduce our costs of production. If we can beat synthetic rubber in cost, I am confident that the future of our industry is assured.

This, of course, means that we must replace our old low-yielding areas with modern high-yielding material. Many of us have already done so to a very considerable extent and are in a position to sell our rubber profitably not only at today's price for synthetic but even at substantially lower prices. It may be that we will have to meet prices for synthetic lower than today's levels, for if competition intensifies it can be expected that producers of synthetic rubber will endeavour to reduce their prices.

Cost of Producing Synthetic

Whether they will be able to do so remains to be seen. The major portion of the cost of production of synthetic rubber is the cost of its raw materials. These raw materials are for the most part obtained from oil and it is possible that oil companies will reduce their prices. On the other hand the oil companies may be far-sighted enough to see that too intensive competition in the rubber field may so reduce the economy of the natural rubber producing territories that sales of their primary products in these areas will be endangered. There must, moreover, be a limit below which it would not be profitable for the oil companies to supply the raw materials for synthetic rubber. That this is so has already been indicated by one of the largest producers of synthetic rubber, which has gone on record as saying that there is no synthetic rubber nor can they foresee a synthetic rubber being developed which will be able to compete with efficiently produced natural rubber for general purpose use.

Apart from all this it should be borne in mind that synthetic rubber is being produced in countries which are already highly developed. It would

be strange indeed if these countries used their resources to enable synthetic rubber to indulge in cut-throat competition with natural rubber which is the main prop in the economy of a number of the so-called under-developed countries.

Great Progress in Malaya

Here, however, I would like to make special reference to Malaya, where the modernization of the rubber industry has been most outstanding. The great progress which has been made in this territory has been due to the way in which the Government and the industry have co-operated to restore Malaya to the position of the world's premier producer of natural rubber.

The industry has helped by demonstrating its confidence in natural rubber and in the future of the Federation. As you will have seen from our annual report, our member companies operating in Malaya have been modernizing their plantations by re-investing at a rate equivalent to more than one and a half times the dividends they have paid. The Government on its part has, by means of its replanting scheme, introduced in 1955, been helping all sections of the industry to accelerate the rate of replanting with modern high-yielding material. This mutual trust between Government and industry has already achieved much and as it continues — and continue it will — even greater benefits will accrue not only to the industry but to the whole economy of the Federation. Continued co-operation between Government and the industry will ensure Malaya's retention of her proud position as the greatest producer of natural rubber.

Research

The Government of the Federation has also been co-operating with the industry in the field of research. The whole structure of the organizations dealing with the Malayan industry's research and development work has, with the assistance of Government, been remodelled. This re-organization, which has been carried out by Sir Geoffrey Clay, who was appointed as the Federation's Controller of Rubber Research in 1959, has only recently been completed. We are, however, pleased to observe that two new fields of research have already been entered upon, following a suggestion made by us. These are the blending of natural and synthetic rubbers and the oil extension of natural. I feel sure we can rely on the excellent staff of scientists employed by the various bodies under Sir Geoffrey Clay's control to enable natural rubber not only to retain its share of world demand but to increase that share. We must help them by making the best use of their results so that they will not be at any disadvantage in competing with synthetic on economic grounds.

The Rubber Growers' Association has always been an advocate of research and development work in natural rubber. The present organizations

C. JACKSON
chairman of the RGA, 1961-62

dealing with such work in Malaya, Ceylon and the United Kingdom owe their origins to us. In addition, some of our members have their own private research organizations and these have provided and are continuing to provide some of the best high-yielding planting material so far available.

We have also played a leading part in helping to solve many of the problems which have confronted the industry both nationally and internationally. It is perhaps not without significance that in the Federation of Malaya where we have been allowed to operate freely without restraint or hindrance, there are to be found not only the most progressive estates but also the most efficient smallholders' rubber industry.

Organized Labour's Role

I have referred to the parts which have to be played by governments and ourselves in assuring the future of natural rubber. There is a third partner in our industry. I refer, of course, to organized labour. Natural rubber is tapped by hand. As such, the cost of labour is and will probably always be, the major factor in our costs of production. Increased yields can only continue to reduce our costs if wage demands do not become unreasonable. I hope this is realized by the leaders of organized labour. If they refrain from making unrealistic wage demands the industry will be able not only to meet the challenge of synthetic but to expand and so continue to give increasing employment. Moreover, as productivity per unit area increases so will productivity per man/day which in turn will bring with it a higher financial return to the worker.

If organized labour plays its part along with governments and ourselves then despite the technical improvements which have taken place in synthetic rubber we need have no fears for the future.

UK and US Stockpiles

It had been hoped, I believe, that sales of rubber from the UK and US stockpiles would have contributed to a more stable price for natural rubber. Sales have been taking place from these stockpiles for more than 18 months now and although approximately 180,000 tons had been sold by the end of last month, natural rubber prices have continued to fluctuate. During this period the price of our product has risen to quite high levels and although we have made an immediate profit from these high prices, in my opinion they have undoubtedly not been in our long-term interests. They have, in fact, not only led to an increased use of conventional synthetics, as I have already mentioned, but they have also encouraged the establishment of an increased capacity for the new stereo-regular synthetics.

The UK stockpile has now been reduced to some 27,000 tons but the US stockpile has still got over one million tons on hand of which the Government is at present charged with the disposal of over 350,000 tons. I would hope that in the disposal of this substantial tonnage it would be possible for the British and American Governments in consultation with the governments of natural rubber producing countries and with the experience they have gained since October 1959, to come to some new arrangement which would help natural rubber to maintain and strengthen its competitive position.

I have endeavoured to examine the various problems which face us as producers of natural rubber. I hope I have stated these fairly and honestly. It may be I have exaggerated some of them, but if so I feel it is better to be prepared for the worst. Of one thing I am certain, and that is that despite all our problems natural rubber can meet and beat any challenge that may come from synthetic. It will do so if we, as producers, make the best use of the results achieved by our research workers to become more efficient and if we have the full support of the governments of the producing areas and of organized labour.

Future Events

Institution of the Rubber Industry

Midland Section. — June 2 at the Midland Institute. Sixteenth Foundation Lecture, followed by dinner at the Queen's Hotel, Birmingham.

Plastics Institute

Scottish Section. — May 31 at 460 Sauchiehall Street, Glasgow, at 3.30-5 p.m. 'Use of Thermex Heat Transfer Medium', 'Use of Titanium for Chemical Plant', and 'Ways and Means of Making Use of the Special Properties of Silicones'. The speakers will include Dr D. W. Ingram and C. B. Ingram.

Plantation Newsletter

Owing to pressure on space, Plantation Newsletter has had to be held over. It will appear next week.

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

THE time was 11.30 a.m., the date Thursday May 18, the place Wigmore Hall, London. This was the combination of factors that brought shareholders of the mighty I.C.I. group face to face with their directors for the annual 'get-together'. And for those who could find time to turn out, Mr Paul Chambers, the chairman, had an interesting report. Sales so far in 1961 are 'about equal' in volume to those of a similar period a year ago, he said. However, he had to point out that profit margins are likely to be kept down by competition both at home and overseas. But taking everything into account there was nothing to change the board's forecast of last January that it hoped to maintain the dividend on the larger capital.

Mr Chambers in an extensive speech also found time and space to comment on his decision to set up plant in the Common Market. There may have arisen some misunderstanding about the timetable of the planned Rotterdam developments. An option had been taken out on the lease with the intention of developing this particular site as opportunity offered in the years to come. As yet there were no definite plans about the manufacturing plant to be put up but there was every reason to expect this site to be ultimately developed. 'We have come to the conclusion that manufacture on this site is likely to prove sound and profitable whether Britain becomes more closely associated with the European economic community or not', he declared. Having decided to manufacture in Holland it was likely that in years to come the group might also be making goods elsewhere within the community.

Commenting on the Budget, the chairman said some forthright things about the present Chancellor of the Exchequer and his plan to introduce a profits tax. Not least of these was the fact that Mr Selwyn Lloyd himself had condemned such proposals when he was in opposition. Only goes to show, I suppose, that it all depends on what side of the fence you are, as to what you oppose or support when it comes to politics.

In a report to shareholders the directors of REICHHOLD CHEMICALS say that sales of vinyl products showed a downward trend in the last quarter of 1960. There are, however, signs of a reversal of the trend and an increasing improvement in profitability is expected from the company. It has been decided for the time being to defer plans for building the proposed new vinyl factory at Brockhampton. Dur-

Continued on page 817

Share Price Movements

Par Value	Company	1961 High	Low	May 13	Latest
£1	A.E. Ind. Ord.	48/6	40/3	43/-	43/3
5/-	Albright & W. Ord. ..	29/6	26/3	29/-	27/6
£1	„ „ „ 5% Pref.	17/3	14/6	14/6	14/6
5/-	Anchor Chemical Ord. ..	25/6	16/-	22/9	25/-
4/-	Airfix	52/6	34/6	50/9	50/9
4/-	„ Non Voting ..	50/-	33/6	49/-	48/3
5/-	Andersons Rub. Ord. ..	—	—	3/9	3/9
£1	Angus Geo. Ord. ..	83/-	58/6	77/6	82/6
5/-	Ault & Wiborg Ord. ..	30/-	25/9	28/9	30/-
£1	Avon India Rubber Ord.	46/6	30/-	37/6	38/3
£1	„ „ „ 6% Pref.	19/3	18/-	18/9	18/9
10/-	Bakelite Ord.	66/3	42/3	58/-	63/9
£1	„ 6% Pref. ..	19/3	16/6	17/6	17/6
£1	Baker Perkins Ord. ..	59/6	40/6	58/9	58/-
4/-	Bank Bdg. Rubber Ord.	3/6	1/9	3/-	2/6
4/-	Bettix	11/9	7/6	11/-	11/-
4/-	Brammer H. Ord. ..	17/-	16/-	16/-	16/-
10/-	Bridge, David Ord. ..	60/-	46/9	59/6	58/6
5/-	Bright, John Ord. ..	18/9	13/9	18/3	18/7½
5/-	Brit. Blting & Asb. Ord.	24/-	17/6	23/9	23/6
£1	„ „ „ „ Pref.	—	—	15/9	15/9
5/-	British Electronic Indus.	15/6	12/-	14/-	13/6
2/-	Brit. Ind. Plas. Ord. ..	14/-	7/9	13/-	14/-
2/-	„ 10% (tax free) Pref.	9/9	4/3	9/9	9/9
£1	British Xylonite Ord. ..	93/-	63/-	90/-	93/-
£1	„ „ 5% Pref.	18/9	14/-	14/4½	15/-
£1	BICC Ord.	62/-	50/3	61/6	58/-
5/-	BTR Ind. Ord.	19/9	13/6	16/9	17/9
£1	„ „ 7½% Pref. ..	21/6	20/9	21/3	21/3
£1	Courtaulds Ord.	47/6	39/6	45/6	43/-
£1	„ 5% 1st Pref.	16/-	14/9	15/3	15/6
£1	„ 6% 2nd Pref.	18/3	16/9	17/6	17/6
4/-	Cow, P. B. Ord.	10/6	7/6	10/1½	10/3
£1	„ „ 5% Pref. ..	14/3	13/3	13/6	13/6
1/-	Dannimac Mfg. Ord. ..	15/3	12/-	15/-	15/-
10/-	De La Rue Ord. ..	68/9	56/-	67/6	66/3
£1	„ „ „ 3½% Pref. ..	10/6	9/6	10/-	9/6
10/-	Distillers Co. Ord. ..	42/3	30/-	39/6	40/3
£1	„ „ 6% Pref. ..	20/3	18/3	18/9	18/9
£100	„ 5% Conv. Loan	£96	£91	£92½	£92½
£100	„ 5½% Unsec. Loan	£86½	£80½	£80½	£80½
10/-	Dunlop Rubber Ord. ..	29/-	21/6	27/9	27/6
£1	„ „ 5½% Pref.	16/-	15/-	15/9	15/9
£100	„ 3½% 1st Debs.	£69	£67	£68½	£69
£100	„ 4½% 2nd Debs.	£79	£76	£78	£79
£1	Eng. Elect. Ord. ..	40/6	32/3	35/9	35/6
4/-	Ebonite Cont. Ord. ..	8/6	7/-	7/6	7/9
£1	English China Clays Ord.	117/6	80/-	117/-	115/-
£1	Goodyear Tyre 4% Pref.	11/6	10/9	11/3	11/3
5/-	Greeff Chem. Ord. ..	37/6	22/9	33/9	36/6

Par Value	Company	1961 High	Low	May 13	Latest
10/-	Greeff Chem. 5½% Pref.	8/3	7/9	7/6	7/6
4/-	Greengate & Irwell Ord.	6/9	5/6	6/6	6/9
5/-	Hackbridge Hldg. ..	6/9	4/9	5/6	5/9
£1	Harrisons & Crosfield Dd.	57/6	48/9	57/6	55/-
1/-	Hunt & Moscrop Ord. ..	2/3	1/3	2/-	1/9
£1	Imp. Chem. Ord. ..	81/6	63/-	79/1½	78/3
£1	„ „ 5% Pref. ..	16/3	14/9	15/9	16/-
£100	„ 4½% Unsec. Loan	£83	£78	£80½	£81½
£100	„ 5½% Conv. Loan	£93	£87	£90½	£91
1/-	Kleemann (O. & M.) Ord.	21/3	8/3	18/6	19/9
£1	„ 6½% Pref.	17/6	16/3	16/3	16/9
5/-	Laporte Ind. Ord. ..	30/9	24/-	28/9	28/9
£1	„ „ 7½% Pref.	23/-	21/3	21/3	21/3
£1	Leyland & Birm. Rubber Ord.	59/3	46/3	58/9	57/9
£1	„ „ „ 6% Pref.	18/9	17/6	17/6	17/6
2/-	London Rubber	15/-	9/6	14/6	14/9
£1	„ 6% Red. Cum. Pref.	20/-	17/6	17/6	17/6
£1	McKechnie Bros. Ord. ..	64/6	53/6	60/6	63/9
£1	„ „ 'A' Ord.	64/-	52/6	62/6	63/9
£1	„ „ 6% Cum. Pref.	18/-	16/-	17/-	17/-
5/-	Monsanto Chem. Ord. ..	27/6	23/-	25/-	23/9
£1	„ „ 3¾% Pref.	12/6	11/6	12/-	12/-
£100	„ „ 6% Debs.	£98	£95½	£95½	£95½
5/-	Miles (H.G.) Hldgs. Ord.	7/9	7/-	7/6	7/6
2/-	Movitex	—	—	6/10½	6/9
£1	North British Rubber ..	21/3	13/9	14/3	14/-
5/-	Northwestern Rubber ..	13/-	9/-	12/-	12/-
5/-	Plastic Enginrs. Ord. ..	37/6	28/6	37/-	37/6
10/-	Projectile & Eng. Ord. ..	50/6	22/6	47/6	47/6
5/-	Redfern Holdings Ord. ..	3/9	2/9	3/-	3/-
2/-	RFD Ltd. Ord.	6/3	3/6	6/3	6/-
£1	„ „ 5½% Pref. ..	15/-	12/6	13/6	14/6
2/-	Rubber Imp. Ord. ..	6/3	3/3	4/-	3/9
2/-	„ „ 'A' Ord. ..	5/-	2/9	3/3	3/3
£1	„ „ 5% 1st Pref.	13/3	11/3	12/3	12/3
5/-	Rubber Reg. Ord. ..	18/3	16/9	17/3	18/-
4/-	Shaw Francis Ord. ..	24/6	18/9	24/-	23/-
2/-	Silentbloc Ord.	10/6	8/3	10/3	10/3
5/-	Storey Bros.	46/-	35/-	42/3	42/6
2/-	Sussex Rubber Ord. ..	2/7½	1/9	2/3	2/3
5/-	Sutcliffe Speak Ord. ..	18/6	13/6	18/3	18/6
£1	Tootals	35/6	28/-	32/3	34/9
£1	Turner & Newall Ord. ..	78/-	55/-	74/-	68/6
£1	„ „ „ 7% Pref.	21/6	20/9	21/3	21/3
5/-	Universal Asbestos Ord.	27/-	21/3	26/6	25/-
5/-	Viscose Dev. Ord. ..	16/3	13/3	15/3	15/6
5/-	Warne W. (Holdgs.) Ord.	21/-	14/9	19/9	20/6

Rubber Markets

LONDON

Quotations were adjusted downwards in conformity with lower Eastern levels, but very little buying interest was aroused. The intervention of the Whitsun holiday tended further to restrict business. Prices continued slightly below Singapore values. Dealers were disinclined to extend short positions and enquiries found sellers rather reserved.

Latest prices are as follows:

No. 1 RSS Spot: 25⅞d.-26⅛d.

Settlement House:

June 26d.-26¼d.
July/September 26⅛d.-26⅜d.
October/December 26⅛d.-26⅜d.
January/March (1962) 26⅛d.-26⅜d.
April/June 26⅛d.-26⅜d.

No. 1 RSS cif basis ports:

June 25⅝d.-25⅞d.
July 25⅝d.-25⅞d.

Godown:

June 87 Straits cents nominal.

Latex

Centrifuged 60% latex per gallon in drums, seller, July, 14s. 10d., cif European ports. Spot, seller, 15s. 5d. Bulk, seller, d.w. 14s. 8d. Creamed, seller, 14s. 7d. nominal. Normal, seller, July, 12s.

NEW YORK

The New York rubber market ruled as under on May 22:

Dealers' Prices

	U.S. cents per lb., ex-dock	
	May 22	Previous
No. 1 RSS, June ..	31⅛n	31⅜b–32a
July ..	31⅜a	31⅜t
No. 2 RSS, June ..	31⅛n	31⅜b–31⅝a
July ..	31⅜a	31⅜b–31⅝a
No. 3 RSS, June ..	31⅛n	31⅜b–31⅝a
July ..	31a	31⅜b–31⅝a
No. 1 RSS, Spot ..	31⅛n	32n
No. 3 amber blanket crepe, June ..	—	26¼n

Futures—Rex Contract

	May 22	Prev. Close
May ..	31.30b–32.00a	31.37n
July ..	31.30t	31.85b–31.90a
Sept. ..	30.56b–30.80a	31.30b–31.45a
Nov. ..	30.50–30.45t	31.10b–31.20a
Jan. ..	30.30b–30.40a	30.85b–30.95a

Sales: 64. Tendency: Easy.

Rubber futures were easy on May 22 in very thin dealings on scattered selling. Traders noted slightly the lower Singapore market, but with London closed and the annual rubber trade outing, interest was scanty. Physical rubber was very quiet. Towards the close, rubber futures were easy and off more than a half cent for the day on commission and stoploss selling. Dealings for the day were fair. Physical rubber latterly showed an easier undertone but was quiet.

SINGAPORE

With a general lack of buying interest on May 22 the market sagged at the outset in quiet trading to the lowest level for several weeks. Rather better buying developed, however, at the low point. During the afternoon the market moved lower on upcountry selling. Lower sheet interest was light.

	Malayan cents per lb., fob Malayan ports to open ports	
	May 22	Prev. Close
No. 1 RSS, June ..	87⅞–88⅛	89⅛–89⅜
July ..	88⅛–88½	89⅜–90⅛
No. 2 RSS, June ..	87⅝–88	89⅛–89⅜
No. 3 RSS, June ..	87⅛–87⅝	88⅜–89¼
No. 4 RSS, June ..	83½–84½	85 –86
No. 5 RSS, June ..	75 –76	76 –77
No. 1 RSS, Spot ..	87⅞–88⅛	89⅛–89⅜
No. 3 blanket thick re-milled crepe, June	73½–74½	73¾–74¾
No. 1 fine pale crepe, June	93½–95½	94½–96½
2x thin brown crepe, June	71½–72½	73¼–74¼

Tendency: Quiet and slightly easier

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular dums, fob, at 177.80d. per gallon.

AMSTERDAM

The Amsterdam rubber market ruled as under on May 23:

No. 1 RMA	Guilders per kilo	
	May 23	Previous
May	2.43	2.46
June	2.43	2.46
July	2.44	2.47
August	2.44	2.47
September	2.44	2.47
July/September ..	2.44	2.47

Sales: Nil. Tone: Quiet.

DJAKARTA

The market closed quiet on May 23 with prices lower in line with overseas advices. Only 10 tons of No. 1 sheet were sold at 34.50 rupiahs per kilo, ready delivery.

	Rupiahs per kilo	
	May 23	Previous
Spot No. 1 priok ..	33.50b	34.00b
Spot No. 2 priok ..	32.50b	33.00b
Spot No. 3 priok ..	31.50b	32.00b
No. 1 fine pale crepe, spot	31.00b	30.50a

Tendency: Quiet

BANGKOK

The price of No. 1 RSS at Bangkok on May 22 was 28.25 (28.37½) US cents per lb.

CEYLON

The price of No. 1 RSS at Colombo on May 22 was 107¼ (109¾) Ceylon cents per lb.

IRI GOLF

Wallwork Qualifiers

The Manchester Section held their Qualifying Round for the Wallwork Cup recently at the Stockport Golf Club, Torkington. The Manchester Section will have 15 qualifiers in all, including the president of the Society and the captain of the section.

Weather conditions were absolutely ideal and the course was in excellent condition. The standard of play was high and the winner of the competition was Eric Cheetham, with a nett score of 69, off a handicap of 13. This was followed by B. J. Newey with a nett score of 74, off a handicap of five. S. T. Diggle turned in the best gross score of 77.

An excellent dinner was provided by the Stockport Golf Club, and S. Heywood, the captain of the Manchester Section, presided, and had the pleasure of distributing some 14 prizes to the qualifiers.

Nett scores were as follows: G. E. Cheetham 69; B. J. Newey 74; S. T. Diggle 74; H. West 75; T. R. Waring 75; J. N. Dexter 76; J. M. Ferguson 76; A. Tonge 77; R. A. Allenby 77; C. T. Manson 78; S. K. Roberts 79; H. K. Mills 79; R. Ball 79; A. W. Ayres 80.

The captain and committee of the Manchester Section wish to thank the following members for the donation of prizes for this match: T. A. Wilson, British Recovered; F. Savaage, Anchor Chemical; E. Morris, Greengate and Irwell; R. A. Allenby, West and Senior; B. J. Haill, Dunlop Rubber; G. Betts, Travis Industries; S. Heywood, Alfred Smith; H. K. Mills, Rubber Regenerating; D. M. Edwards, Dunlop Rubber; C. T. Manson, Universal Oil; S. K. Roberts, I.C.I.; T. R. Waring, I.C.I.

STOCK MARKET

Continued from page 816

ing 1960 all companies were faced with substantial increases in labour costs. The new resin plant at Speke should be in production by the end of this month.

Meantime in the stock market place more records have been broken and new price peaks attained by many sections. In front of the holiday there was some evidence of profit taking and this brought the boom in shares off the boil, which is just as well perhaps. For many brokers have been worried at the fast and furious pace of the past few months. Some kind of technical reaction is overdue. But I do not think that the leaders will be allowed to fall very far. All that is needed if there is to be a lull in trading activity over the coming weeks is patience. Good class equities should certainly not be parted with — yet.

Industry INTELLIGENCE

Technical Data

Low Mooney Polymer

Texas-US Chemical Co., 9 Rockefeller Plaza, N.Y.20, New York, has issued a technical data sheet on a cold, low Mooney polymer — Synpol 8104, which is non-staining and non-discolouring.

Synpol 8104 is designed to supplement the normal-Mooney, cold polymers. It can replace these in sponge compounds and eliminate the use of chemical plasticizers. It is also useful as a process aid or as a substitution for normal-Mooney polymers in highly-loaded compounds where its low viscosity will improve extrusion, calendering, and mould flow. As well as being able to improve processing, the rubber is said to exhibit good light discoloration resistance and is useful in producing the lightest colour vulcanizates.

Synpol 8209B

Texas-US Chemical Co., 9 Rockefeller Plaza, N.Y.20, New York, has issued a technical data sheet on a cold (intermediate styrene) oil-extended polymer — Synpol 8209B. This is said to be non-staining and non-discolouring 25.0pts. naphthenic oil.

Synpol 8209B offers the manufacturer a combination of good physical properties, light colour, satisfactory processability and economy. It has a bound styrene content of 35%, extended with 25 parts of a light-coloured naphthenic oil per 100 parts of polymer.

Machines, Materials and Equipment

Lifting Tool

A very simple handled clamp has been introduced which enables metal sheets, angles, tubes and other awkward objects to be handled in safety. Its use should reduce the danger of trapped fingers and cut hands.

The device weighs only 1lb., has a jaw capacity of ¾in., and is claimed to be able to lift 160lb., or pull a load of 340lb. The hand-operated clamp reacts to touch, and depending on the position of one's hand and the amount of pressure exerted, it will cling to any object.

Lifting and Tipping Machine

In answer to the need for a machine for lifting and emptying all types of containers, Russell Constructions Ltd. has developed a unit which is claimed to be able to lift any kind of container weighing up to 10cwt. and tip it so as to empty the contents into a hopper, truck, mixer, or other receptacle. This machine, known as the 'Hi-Tip' has a minimum height of lift of 4ft. 6in. Vertical sections can be added to increase this dimension to any height desired. The machine is said to be suitable for continuous 24hr. operation.

Further details can be obtained from the company at Russell House, Adam Street, W.C.2.

Ladder Attachment

A working platform, made of steel and aluminium and about 4ft. wide, can be bolted on to the top of a ladder. Wide enough to span most windows, the V-recess at the front bridges downpipes or other similar wall attachments, as well as the corners of buildings. It has hooks for hanging paint pots, and there is a wooden insert in the tray, so that a vice can be fixed or chisels used without the risk of damaging other tools. The tray is fitted with spring-loaded arms, and ball castors enable the ladder to be easily raised or lowered, as required, or moved across the face of a wall. The platform can be adjusted for use with wooden or metal ladders of different widths.

Tube Joint Assemblies

A simplified constructional system has been introduced which allows standard tubes to be built up with the use of only five basic jointing units and no special tools. Tubes joined in this way can be assembled to form storage racks, stands, benches or shop fittings. The user can obtain supplies of joints to use with his own tubing, or complete assemblies can be produced and shipped in a knocked-down condition for local assembly. The basic principle used provides in every case for a compressive force acting at one part of the joint balancing an expansive force at another. The T joint is first slid over one tube, thus causing the right angled part of the joint to spring open. This is compressed with a self-locking wrench and fitted into the right angled tube. On driving home with a soft faced hammer, a firm joint is produced.

New Air Valve

A new form of air valve has been developed in which air passes over a series of blades in the forward direction, but a very slight reverse pressure causes the blades to seat in their housings and close the channels.

Two interesting features are that the moving blades have very low inertia, so that the valve can operate at high speeds, up to at least 3,000 cycles per min., and that in the open position the straight-through flow channels offer very little resistance. The number of channels provided is varied in accordance with the throughput to be handled.

The valves have already been used in conventional compressors to great advantage, and they should find application to internal combustion engines, as rapid shut off valves in chemical plant, and in similar uses.

Density Gauge

A new density gauge is intended for continuous recording of the density of material — liquid, solid, slurry, etc. — flowing through a pipe. No contact is made with the contents of the pipe; a unit clamped round its exterior holds a radioactive source and a sensitive photomultiplier so that radiation from the source is measured by the photomultiplier after being attenuated by traversing the pipe. The output of the photomultiplier controls a recorder calibrated to indicate the density of the material in the pipe. An interesting feature is a fully automatic unit which checks the calibration of the instrument every ten minutes during operation, and makes any necessary adjustments to maintain the standard. The high sensitivity of the photomultiplier enables a small source to be used.

Publications

Pigments in a Ball Mill

British Titan Products Co. Ltd., 10 Stratton Street, W.1, has issued a booklet, reference No. BTP/84, which describes the performance of tioxide pigments in a ball mill. This is at present the most widely used machine in the paint industry, mainly due to its milling efficiency being combined with a small labour requirement.

The booklet is intended to give background information on the ball mill and to explain in detail the basic principles of formulation of a satisfactory mill base. Information in the publication includes the theory of ball milling, the milling process, and the operation of the ball mill.

Nonox Products

The Dyestuffs Division of I.C.I. has issued No. 6 of Rubber Chemicals Literature. It deals with Nonox EX, Nonox EXP and Nonox EXN. The first two products are powerful non-staining antioxidants recommended for applications involving white or coloured rubbers, such as white tyre sidewalls, flooring, wringer rollers, cellular rubbers, proofings and bathing caps.

Nonox EXN is also a strong non-staining antioxidant, but unlike the others which are supplied in massive resin form, it is manufactured in the form of a fine powder. The applications are the same as for EX and EXP.

NEW COMPANIES

Plastic Coating Equipment Ltd. (690,780). April 25. Capital: £100 in £1 shares. Regd. office: Woodbridge Industrial Estate, Guildford.

U.T.P. Packaging Co. Ltd. (690,788). April 25. Capital: £5,000 in £1 shares. To carry on the business of manufacturers of, and dealers in, polythene bottles and containers generally, including bags, wrappings, etc. The directors are: Sidney A. Bailey and Thelma R. M. Bailey, both of 4 West Road, Saffron Walden, Essex. Regd. office: Shine Hill Industrial Estate, Saffron Walden, Essex.

Solray Plastics Ltd. (691,330). May 2. Capital: £1,000 in £1 shares. To carry on the business of manufacturers importers and exporters, wholesalers and retailers, moulders and fabricators of, and dealers in, plastics substances and synthetic materials; powders and materials, including plastics sheet, etc. The directors are: David H. Miller and Harold E. Mill, both of 77 Bickenhall Mansions, Baker Street, W.1. Regd. office: 128 Baker Street, W.1.

Agricolastic Rubber and Plastics Co. Ltd. (691,358). May 2. Capital: £100 in £1 shares. To carry on the business of dealers in, and manufacturers of, component and spare parts and accessories for agricultural machinery, etc. The directors are: Joseph H. Cooper and Barbara C. Cooper, both of 14 Green Island, Porritt Lane, Irton, Scarborough; Charles Cooper, Rose Cottage, Irton, Scarborough. Regd. office: Falconer Chambers, Huntriss Row, Scarborough.

Flexi Foam Ltd. (691,281). May 1. Capital: £100 in £1 shares. To carry on the business of manufacturers of fittings, furniture and articles composed of plastics, etc. The directors are to be appointed by the subscribers. Regd. office: 31 Bold Street, Warrington.

CLASSIFIED ADVERTISEMENTS

RUBBER AND PLASTICS WEEKLY

APPOINTMENTS VACANT

6d. a word. Minimum 12/6 Box 2/-

A RUBBER technician is required by a firm in the Manchester area, to work on the development of a wide range of natural and synthetic rubber compounds. Applicant must have attained at least LIRI standard, and experience in compounding would be an advantage. Part-time day release would be allowed for study on a recognised IRI course.—Write giving details of age, qualifications and experience to Box 1083. (1083)

QUALIFIED

WORKS STUDY ENGINEER

required

to take charge of Works Study Department in an expanding Company, interested in full automation and maximum machine loading. Must be fully conversant with Piece Work, Incentive Schemes and Budgetary Control. Good salary and prospects for young energetic man with ideas and ambition. Life Assurance, Superannuation Scheme.

Replies in confidence to Box 1080. (1080)

P. B. COW (PLASTICS) LIMITED

Applications are invited for the following positions within P. B. Cow (Plastics) Limited:—

Product Development Technicians for the extrusion and general fabrication departments.

Successful applicants should have an ability to solve technical and development problems associated with plastic extrusion production. Basic technical training up to Intermediate Degree standard is required and keenness, a practical outlook, some engineering aptitude and a sound practical knowledge of extrusion and fabrication of the following materials, i.e., flexible PVC, rigid PVC and Polyethylenes are essential.

The development work will be divided between the following fields:—

(a) Bottle blowing.
(b) General extrusion.
(c) Evaluation of new materials and products.
(d) Refrigerator gasket productions.

The positions will carry excellent prospects of progressing to management level and a salary in the region of £1,200 per annum.

Applications in confidence to:—

P. B. Cow (Plastics) Limited,
Falmouth Road,
Trading Estate,
Slough, Bucks.

Marked for attention of Technical Director. (1038)

APPOINTMENTS VACANT

(continued)

ASSISTANT chief chemist. Applications are invited from experienced chemists with a good knowledge of rubber and plastics technology.—Apply giving details of age, experience, qualifications, salary, etc., to Personnel Manager, Fireproof Tanks Ltd., The Airport, Portsmouth, Hants. (1069)

A TECHNOLOGIST is required for a senior position in the Technical Department of a leading Rubber Company. The selected candidate will head a team responsible for the compounding of rubber and plastics for a wide range of products manufactured for the engineering industries. Compound development and technical control of production mixes together with associated process are the responsibility of the team. Candidates shall be not less than 30 years of age, have had a minimum of 5 years' experience of compounding in a production unit, and hold a degree and/or other recognised qualification. An attractive salary will be paid to a man with a progressive outlook. All applications will be treated in the strictest confidence.—Apply Box 1055. (1055)

RUBBER technologist required for works control processes and procedures. Experience of proofing essential and some knowledge of footwear desirable. Excellent opportunity, pension scheme.—Reply in confidence to Chief Chemist, Greengate and Irwell Rubber Co. Ltd., Greengate, Manchester, 3, stating age, experience and qualifications. (1075)

BTR

MICROCELL LTD

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require at

CAMBERLEY, SURREY

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to undertake special RESEARCH and DEVELOPMENT work of a highly confidential nature.

Applicants, preferably aged 25-35, should be GRADUATES. Knowledge and experience in the RUBBER INDUSTRY, particularly of properties of elastomers and the effect on product quality especially in the field of precision moulding of solid and expanded rubbers.

The Company offers:—

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HOLIDAYS rising from 3 weeks after 1 year.
GOOD WORKING CONDITIONS in very pleasant locality.

Send tabulated details of experience, education, etc., including present salary, to

Central Personnel Department (ref. MC)
BTR INDUSTRIES LTD
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Vincent Square,
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Group Personnel Officer (ref. HPT),

BTR INDUSTRIES LTD

Herga House,
Vincent Square,
London, S.W.1. (1078)

RUBBER technology. An experienced laboratory technician is required as direct assistant to the Chief Chemist of an industrial rubber manufacturers in Slough. A knowledge of production of commercial proofings is essential. The commencing salary will be commensurate with qualifications and experience, but will not be less than £1,000 per annum. The position is permanent, progressive and superannuation facilities exist.—Apply giving full details to Box 1076. (1076)

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RUBBER & PLASTICS

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MACHINERY FOR SALE

6d. a word. Minimum 12/6 Box 2/-

BRIDGE 60in. x 22in. mill with 100 h.p. drive. 30in. x 24in. and 21in. single geared cracker with 200 h.p. drive. 8½in. Royle extruder with 120/40 h.p. drive. Shaw 48in. x 18in. 3-bowl calender with 30/15 h.p. drive. Several 42in. mills.—Reed Brothers (Engineering) Ltd. (Receiver and Manager—Mr. C. E. M. Hardie), Woolwich Industrial Estate, London, S.E.18. Tel. Woolwich 7611. (1081)

B.U.S.M. 4-column punching or cutting platen press for sale. Size of top platen 45½in. x 13½in. Length of stroke 2½in. Adjustment to bed 6in. Daylight, stroke down, adjustment close, 16in. Arranged motor drive 220/400/1/50. Friction clutch.—F. J. Edwards Ltd., 359 Euston Road, London, N.W.1, or 41 Water Street, Birmingham 3. (1082)

COVENTRY Climax forklift trucks! A choice selection of electric, petrol and diesel models. From 1,500lbs. to 4,000lbs. capacity. 9ft. to 14ft. lifts.—Full details, photographs and prices from Speed Electrics, Dept. RJ, Church Street, Basford, Nottingham. Tel. 75716. (1071)

PLASTIC injection moulding machine, Windsor 6oz. model SH6. Steam boilers, 200lbs. to 16,000lbs. evaporation; Economic, Cochran, Lancashire; automatic oil and stoker firing; delivery and installation anywhere. Insurance approved and 12 months' guarantee. Highest part exchange valuations.—Fred Watkins (Enginering) Ltd., Coleford, Glos. Telephone: Coleford 2271 (5 lines). (1023)

'WINDSOR' injection moulding machines. Five SH.3, two SH4, one SH.10. Downstroking hydraulic bakelite moulding presses. Maximum pressure about 30 tons. Four 2½in. pillars. Between pillars 11½in. x 7in. Platen 15½in. x 11in. Main ram: diameter 7in., stroke 10in. Several machines available.—Muncaster Machine Tools Ltd., Mary Street, Manchester, 3. Phone DEAnsgate 5864/5. (1064)

Better try

600 *first*

WP.62610 :—Double-Geared Rubber Mixing Mill by Francis Shaw. Rolls 60" x 80" dia. and 27½" dia. Friction ratio 1.178 : 1. Driven through spur gearing and reduction gearbox by 100-h.p. slipring motor complete with starter suitable for 380/420/3/50 cycle supply. Mounted on rolled steel baseplate arranged for vibro mounting, complete with safety gear and guards.

WP.62458 :—Double-Geared Rubber Mixing Mill by Joseph Robinson. Rolls 48" x 16" and 20" dia. Friction ratio 1.3 : 1. Driven through gearing and reduction gearbox by 40-h.p. motor, complete with starter, suitable for 400/3/50 cycle supply.

WP.62508 :—16" x 48" Double-Geared Rubber Mixing Mill by Francis Shaw. Driven through gearing and reduction gearbox by 50-h.p. slipring motor, complete with starter, suitable for 400/3/50 cycle supply. Machine is fitted with modern safety equipment and guards.

WP.62664 :—2" Rubber Extruder by Iddon Bros. Water-cooled barrel and screw fitted with 90° head for cable covering. Machine arranged with three speeds and direct driven by 10-h.p. motor, complete with starter, suitable for 400/3/50 cycle supply. Complete with haul-off and winding equipment.

WP.62669 :—3" Iddon Rubber Extruder. Water-cooled, fitted with right-angle head for cable covering. Direct driven by variable speed motor, complete with starter, suitable for 400/3/50 cycle supply. Machine is complete with haul-off and flanking gear.

WP.62661 :—Vertical Three-Bowl Even and Friction Calender by David Bridge. Bowls 18" dia. x 36" long. Friction ratio 1.56 : 1. Driven through gearing by 45-h.p. slipring motor, complete with starter, and suitable for 400/3/50 cycle supply.

WP.62666 :—Horizontal Unjacketed Vulcanizing Pan by Leeds & Bradford Boiler Co. 5' 0" dia. x 26' long, fitted quick-lock door. Vessel fitted internally with steam and spray pipes and 24" gauge track. Complete with temperature recorder fittings and four-wheeled bogies. Working pressure 60 p.s.i.

WP.62547 :—Horizontal Unjacketed Vulcanizing Pan. 4' 0" dia. x 15' 0" long, fitted bayonet-type quick-locking door, arranged with internal rolls and two bogies. Working pressure 75 p.s.i.

WP.62528:—Vertical Jacketed Vulcanizing Pan by General Engineering Co. Ltd. 6' 0" internal dia. x 6' 0" deep on the straight. Overall height 9' 10". Bayonet-type quick-locking lid, fitted with raising and lowering gear. Working pressure of vessel and jacket 70 p.s.i.

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(1072)

MACHINERY FOR SALE

(continued)

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

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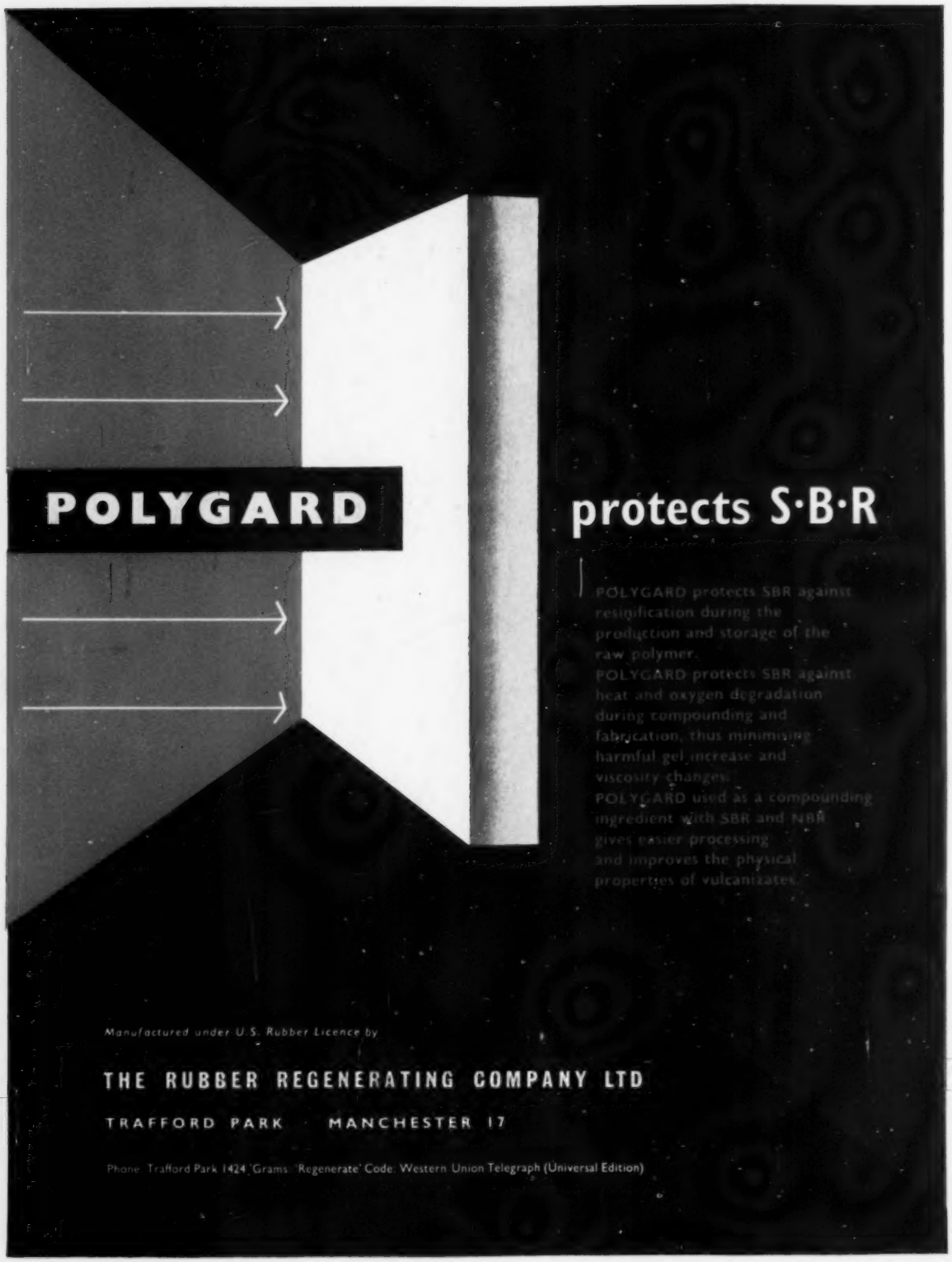
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